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A comparative study of student achievement, program delivery, and teacher training in a gifted program

Mary Frances Briley
College of William & Mary - School of Education

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Briley, Mary Frances, Ed.D.

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300 N. Zeeb Rd.
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A COMPARATIVE STUDY OF STUDENT ACHIEVEMENT, PROGRAM DELIVERY, AND TEACHER TRAINING IN A GIFTED PROGRAM

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by

Mary Frances Briley

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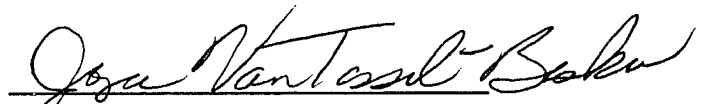
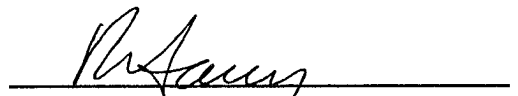
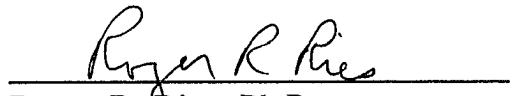


Joyce VanTassel-Baska, Ed.D.
Chair of Doctoral Committee



Robert J. Hanny, Ph.D.



Roger R. Ries, Ph.D.

To my husband

Vernon Allen Briley

. . . . .you understand.
You see me as no one
else sees me.
We both trust silence.

Kahlil Gibran

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Acknowledgments

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To Heather Leigh Briley, always a light in my life, I give a special tribute. I extend a challenge for continued excellence in her studies at William and Mary.

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A COMPARATIVE STUDY OF STUDENT ACHIEVEMENT, PROGRAM DELIVERY, AND TEACHER TRAINING IN A GIFTED PROGRAM

ABSTRACT

The purposes of this comparative study were to determine the effects of (1) a specially developed gifted curriculum for grades four and five on gifted learners, (2) two contrasting instructional delivery systems for gifted students, and (3) differential levels of teacher training in gifted education. The sample was 112 fourth and fifth grade academically gifted students. The students were grouped for comparison based on their assignment to the regular classroom teacher for the 1988-89 school year. Group 1A students attended a one day pull-out gifted program and were assigned to the school based enrichment program taught by teachers who had completed the division training. Group 1B students attended the one day pull-out gifted program and were assigned to the school-based enrichment program taught by teachers with little training. Group 2 students attended the pull-out gifted program and were assigned to regular classrooms. Student growth in the specially developed gifted curriculum was measured in higher level thinking skills,

creative thinking skills, self-concept, and research skills, areas that reflected the major goals of the program. Tests used to measure program impact were: (1) the Ross Test of Higher Cognitive Processes, (2) the Wallach-Kogan Creativity Instrument, (3) the ME Scale: A Self-Concept Scale for Gifted Students, and (4) the GAIN Teacher Assessment of Student Research Skills, Grades 4-5.

Repeated Measures Analysis of Variance (ANOVA) were used to determine student growth gains. Repeated Measures Analysis of Covariance (ANCOVA) were used to determine differential effects of the two program delivery models as well as the staff development model.

Significant student growth gains in the thinking skills of analysis, synthesis, and evaluation; the creative thinking skill of figural fluency; and all major research skills were recorded. The pretest scores on the ME Scale revealed that the students had relatively good self-concepts at the start of the study; posttest results indicated that self-concept levels were maintained. No value-added effects which might be attributed to the school-based enrichment curriculum were recorded for either Group 1A or 1B. With the exception of the performance of Group 1A students in grade five on research skills, no significant student growth differences that could be attributed to staff development were recorded.

Implications of the study suggested the need to add a complementary scope and sequence of skills to the school-based enrichment program for each goal area of the gifted program and the importance of staff communication and collaboration between the school-based enrichment program and the pull-out centers. The selection of a delivery model should be reviewed and decisions made based on student needs combined with school district expectations and constraints. The staff development program should be reviewed for focus and emphasis. Further research should be done (1) to determine the effectiveness of the school-based enrichment program, (2) to validate the assessment instrument for research skills, and (3) to continue to determine the impacts of staff development.

MARY FRANCES BRILEY
SCHOOL OF EDUCATION
THE COLLEGE OF WILLIAM AND MARY IN VIRGINIA

A COMPARATIVE STUDY OF STUDENT ACHIEVEMENT, PROGRAM DELIVERY, AND TEACHER TRAINING IN A GIFTED PROGRAM

Chapter 1
Introduction

Need for the Study

Since the early 1970's there has been a resurgence in special programs for gifted students in this country. Marland (1972) reported to Congress the need to address the nature and needs of gifted students and the development of appropriate programs. Subsequent to the Marland Report, the Office of Gifted and Talented of the United States Office of Education (1976) issued program guidelines and federal grants became available to implement programs. Gifted program evaluations have often been conducted to satisfy requirements for funding programs rather than as evaluation research to examine program effectiveness as determined by student growth gains. National surveys have documented inadequate program evaluation for gifted programs (Cox, Daniel, & Boston, 1987; Gallagher, Weiss, Oglesby, Thomas, 1983; Traxler, 1987).

There also has been a paucity of research to determine curriculum effectiveness (Gallagher, 1966; Gallagher & Weiss, 1982). Few studies have been conducted to assess the efficacy of administrative organizations for the delivery of instruction (Gallagher et al., 1983). Studies have begun to examine teacher

training models. Dettmer (1986), for example, argued the need for research to determine the effectiveness of gifted teacher training. The present study was conducted to address these three major issues.

Statement of the Problem

The purposes of the study were to determine the effects of (1) a specially developed gifted curriculum for grades four and five on gifted learners, (2) two contrasting instructional delivery systems for gifted students, and (3) differential levels of teacher training in gifted education. Student growth was measured in higher level thinking skills, creative thinking skills, self-concept, and research skills, which corresponded to the goals of the gifted program under study.

Three research questions were addressed.

1. What effect does a specially developed gifted curriculum have on the growth of gifted students in higher level thinking, creative thinking, self-concept, and research skills?

HYPOTHESIS 1: Fourth and fifth grade gifted students enrolled in a gifted program will show a significant increase in higher level thinking skills between the fall and spring administration of the Ross Test of Higher Cognitive Processes.

HYPOTHESIS 2: Fourth and fifth grade gifted students enrolled in a gifted program will show a significant increase in creative thinking skills between the fall and spring administration of the Wallach-Kogan Creativity Instrument.

HYPOTHESIS 3: Fourth and fifth grade gifted students enrolled in a gifted program will show a significant increase in self-concept between the fall and spring administration of the ME: A Self-Concept Scale for Gifted Students.

HYPOTHESIS 4: Fourth and fifth grade gifted students enrolled in a gifted program will show a significant increase in research skills between the fall and spring administration of the GAIN Teacher Assessment of Student Research Skills, Grades 4-5.

2. Which administrative organization, pull-out or a combination of school-based enrichment and pull-out, contributes more effectively toward gifted students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills?

HYPOTHESIS 5: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will evidence significantly greater growth in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

HYPOTHESIS 6: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will evidence significantly greater growth in creative thinking skills as measured by the Wallach-Kogan Creativity Instrument when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

HYPOTHESIS 7: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will evidence significantly

greater growth in self-concept as measured by the ME: A Self-Concept Scale for Gifted Students when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

HYPOTHESIS 8: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will evidence significantly greater growth in research skills as measured by the GAIN Teacher Assessment of Student Research Skills, Grades 4-5, when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

3. What differences in students' growth gains in higher level thinking skills, creative thinking skills, self-concept, and research skills may be attributed to levels of teacher training in gifted education?

HYPOTHESIS 9: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having

completed the staff development (Group 1A) will show a more significant increase in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

HYPOTHESIS 10: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will show a more significant increase in creative thinking skills as measured by the Wallach-Kogan Creativity Instrument when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with

incomplete staff development (Group 1B).

HYPOTHESIS 11: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will show a more significant increase in self-concept as measured by the ME: A Self-Concept Scale for Gifted Students when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

HYPOTHESIS 12: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will show a more significant increase in research skills as measured by the GAIN Teacher Assessment of

Student Research Skills, Grades 4-5, when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

Theoretical Rationale

The development of a comprehensive differentiated curriculum based on the needs of gifted learners has been the foundation of gifted education (Kaplan, 1974; Maker, 1982; Passow, 1979; VanTassel-Baska, 1988b; Ward, 1961). Synthesizing research on the characteristics of gifted learners, VanTassel-Baska (1988c, p. 54) cited three fundamental differences that include:

1. The capacity to learn at faster rates (Keating, 1976).
2. The capacity to find, solve and act on problems more readily (Sternberg, 1985).
3. The capacity to manipulate abstract ideas and make connections (Gallagher, 1985).

Maker (1986) argued the necessity of a qualitatively different curriculum for gifted students which should address content, process, and products of learning as well as the

learning environment. The depth, breadth, and pacing of content have been critical issues (Gallagher, 1985; Kaplan, 1979; Maker, 1982; Passow, 1979; VanTassel-Baska, 1988c). Basic skills and concepts should be introduced earlier, addressed more rapidly, and/or covered in more detail with the gifted learner (Kaplan, 1979; VanTassel-Baska, 1988c).

Passow et al. (1979) recommended that curriculum be organized in interdisciplinary units of study with content related to broad-based issues, themes, or problems. Such organization should allow for the inclusion of basic skills, higher level thinking skills, research skills, creative thinking skills, and affective skills related to self-understanding and group interaction, all of which might be appropriate for gifted learners.

It has also been suggested that gifted students should master a clearly defined set of research skills that should enable them to study independently topics of particular interest (Feldhusen & Kolloff, 1983; Renzulli, 1977). Also recommended was an emphasis on higher level thinking skills and teachers have been encouraged to pose questions to enable students to process at high levels of thought (Kaplan, 1979; Maker, 1982; VanTassel-Baska, 1988c). Other writers have emphasized that creativity should be fostered (Feldhusen & Kolloff, 1983; Gowan, 1981; Torrance, 1962). Students should

be expected to create products of learning that might challenge existing ideas or add new perspective (Feldhusen & Kolloff, 1983; Gallagher, 1985; Kaplan, 1979; Renzulli, 1977).

An increasingly important strand of gifted curriculum has been to address the affective needs of gifted students. Extreme sensitivity, perfectionism, and perceptiveness have been listed as characteristics of many gifted students (Clark, 1979; Silverman, 1988). Gifted students should have opportunities to discuss these common concerns with other gifted students. Clark (1979) and Silverman (1988) noted the importance of developing the self-concept or how one feels about oneself in terms of abilities, strengths, and weaknesses. An affective strand in a gifted curriculum might address self-awareness as well as learning to work with others. Feldhusen (1986a) viewed self-concept as a component of giftedness and along with intelligence and self-esteem it might provide for overt motivational predisposition for creative accomplishment. Feldhusen and Hoover (1986) offered that components of giftedness might be modifiable and subject to change. External facilitating factors might enhance gifted behavior; therefore, program goals to enhance self-concept have been justified.

To address the teaching-learning process, several gifted educators (Gallagher, 1985; Maker, 1982; Renzulli, 1977; Ward, 1961) based their ideas on Bruner (1960) who argued the

importance of the structure of a discipline and proposed that the aim of education should be to teach the basic structure of an academic discipline to children. Maker (1982) noted that the learner in the role of the scholar using information might be an appropriate modification in the process of learning. Maker (1982) suggested that implied in Bruner's work might be modifications of products gifted learners produced as well as in the learning environment. The learning environment should be student-centered encouraging independence, complexity, and high mobility (Clark, 1979; Kaplan, 1974; Maker, 1982). Such an environment might foster independence of thought and nurture open communication with genuine acceptance. Clark (1979) stressed a cooperative learning environment.

> When the physical environment is characterized as open, the psychological environment nurturing, and the social environment as cooperative, gifted students may thrive in individual pursuits as well as enable peers in positive group situations. They are no longer labelled and stymied by such labels. (p. 234)

Renzulli (1987) distinguished administrative models from the theoretical instructional models already discussed. Administrative models might consist of organizational patterns and procedures for dealing with such issues as how to group

students, develop schedules for teachers, determine student time allocations to special services, and arrange for the delivery of services. The small number of students in a school's gifted population has presented challenges to determine the appropriate administrative organization for the delivery of instruction. Gallagher et al. (1983) determined through a national study that the predominant strategies used were (1) a resource room/pull-out and (2) school enrichment at the elementary level and a special class setting at the secondary level. The majority of gifted students at the elementary level, based on the Gallagher study, have been in part-time gifted programs.

Appropriate teacher training has been a major issue in developing effective gifted programs. VanTassel-Baska (1988b) argued that an integral part of curriculum development must be a carefully developed plan to sensitize as well as to train personnel to use the new curriculum. The role of curriculum developers has often included facilitating or enabling other teachers to implement the new curriculum. Not only must teachers be acquainted with the new curriculum, but follow-up activities should include sharing sessions among teachers as well as classroom visitations to monitor progress. Feldhusen (1986b) noted that the pull-out delivery system has necessitated a teacher training program that focused on the

needs of the instructional specialist in the gifted resource room as well as the classroom teachers and the importance of good communication among the teachers that share the responsibilities for the instruction of gifted students.

In summary, gifted educators have suggested that interdisciplinary thematic units of study that differentiate content, process, and products of learning might enhance gifted students' achievement when the appropriate delivery of services has been addressed and comprehensive training for teachers has become an integral part of the planning and implementation of a program. Therefore, the issues of curriculum development, the delivery of services, and comprehensive teacher training are critical concomitant concerns in examining the effectiveness of a gifted program.

Definition of Terms

For the purpose of clarification for the reader, several terms used throughout this manuscript have been defined.

Administrative Organization	the mechanism regarding efforts to group students, to determine the delivery system, and to designate who is responsible for the instruction of gifted students.
Affective Skills	skills enabling students to explore feelings and needs related to self-awareness as well as cooperative behavior in groups.
Content	subject matter which is taught, including skills and concepts, organized for the purpose of acceleration as well as to explore in more depth.

Creative Thinking Skills	skills enabling students to offer unusual ideas with an emphasis on fluency, flexibility, originality, and elaboration.
Differentiated Curriculum	curriculum that addresses content, process, and products of learning based on the nature and needs of gifted students.
Gifted Student	any student identified as gifted in general intellectual ability using multiple criteria (i.e., measures of aptitude and achievement as well as behavior checklists completed by teachers).
Higher Level Thinking Skills	skills enabling students to apply, to analyze, to synthesize, and to evaluate information.

Interdisciplinary Unit	concepts and skills from the core subjects (language arts, math, social studies, and science) integrated in thematic units of study.
Learning Environment	the physical arrangement as well as the psychological and social climate established in the classroom.
Process	the way gifted teachers involve students in learning through questions and activities that encourage higher level thinking, creative thinking, a more positive self-concept, and student research.
Products	student results and/or conclusions presented for evaluation to show mastery of studies.

Pull-out Program	an administrative organization where gifted students are clustered from elementary schools in a gifted center for instruction part of the time. In the program under study, students attended the center one day a week for five hours of instruction.
Research Skills	skills used by students in pursuing independent study.
School-Based Enrichment in the Classroom	an administrative organization where gifted students are grouped with nongifted learners in the regular classroom and the classes are provided more in-depth learning experiences by teachers trained to provide instruction to the gifted.

Self-Concept	perceptions of self that develop out of interpersonal relationships.

Description of the Program Under Study

The program under study was a combination of school-based enrichment and a pull-out program. Regular classroom teachers with specialized training to differentiate instruction for gifted students used an interdisciplinary curriculum in the school-based enrichment program four days each week for ninety minutes per day. On the fifth day, gifted students attended a pull-out program for instruction all day taught by gifted instructional specialists in a regional gifted center. The school-based enrichment and gifted pull-out curricula were interdisciplinary by design, which featured units of instruction with broad-based themes. The pull-out curriculum extended, elaborated, and enriched the school enrichment program. Special skill strands for the pull-out gifted curriculum included higher level thinking skills, creative thinking skills, self-concept, and research skills. Students were taught group interaction skills; therefore, cooperative learning was a prevalent strategy to facilitate student learning. Students were encouraged to behave as scientists or inquirers

in the particular field under study and to pursue independent study.

Students identified as gifted in general intellectual ability were grouped together to attend the pull-out program taught by gifted instructional specialists. Regular classroom students and gifted students attended the school-based enrichment program.

The staff development model consisted of graduate level course work combined with inservice training. Eight school-based teachers in the second year of program implementation had completed six graduate hours or two courses that addressed the nature and needs of gifted learners as well as curriculum and instructional strategies appropriate for those learners. The teachers attended workshops for a total of 18 inservice hours on the following topics: (1) interdisciplinary instruction, (2) differentiation of instruction, (3) questioning, (4) creative thinking, (5) affective psychosocial needs, and (6) cooperative learning. The remaining school-based teachers (n = 10) in the second year of implementation had had three or fewer hours of graduate credit and had not attended the inservice sessions.

The gifted instructional specialists, assisted by the core academic curriculum specialists and the gifted coordinator, conducted the inservice sessions for the school-based

enrichment teachers. At least once each month, an instructional specialist visited each school-based enrichment teacher individually or in a small group. Together the teachers planned instruction, shared instructional strategies, discussed the needs of their gifted students, or the instructional specialist taught a demonstration lesson.

Chapter 2

Review of the Literature

The purpose of Chapter 2 has been to review related studies in the literature as they supported and made contributions to this study. The first research question examined the effect of the specially developed curriculum on gifted students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills. For this review, studies to determine program effectiveness have been cited with one or more similar program goals and the samples included upper elementary students gifted in general intellectual ability. The second question addressed the impact of administrative organizations and related studies were cited. The third question examined the impact of teacher training. Recent studies demonstrating effects of inservice teacher training in general education as well as gifted education were cited. The chapter has been concluded with a summary of major research findings related to this study.

Program Effectiveness

In an early review of research on gifted program effectiveness, Gallagher (1966) found little evidence to document gifted curriculum effectiveness; but, did conclude

that gifted students' growth in productive thinking and creativity might be enhanced. Gallagher and Weiss (1982) updated the review and found that studies continued to cite growth in productive or creative thinking i.e., originality, fluency, and flexibility; however, little evidence was cited regarding the transfer of those skills to other learning tasks. The evidence was uncertain to substantiate one delivery model compared to another.

In a comprehensive national study on the status of gifted education, Cox et al. (1987) found that the most frequently reported program option (72%) was a pull-out program. In order to classify the pull-out program as a substantial program, the researchers applied minimum criteria which included contact time of at least one day per week, stated curriculum for at least one content area, and strategies to foster coordination between the classroom teacher and the gifted teacher. Then only 47% of the reported 72% of the programs were classified as substantial programs.

The second most frequently reported program option (63%) was school enrichment. After the researchers applied the criteria that the gifted be identified and clustered for three to five hours weekly for instruction in at least one content area, 16% of those programs were deemed substantial programs.

Respondents reported multiple options (90%); yet, after the researchers' criteria to substantiate the programs were used, less than 50% of those districts had multiple program options deemed substantial. In response to questions on teacher training only 33% required some inservice training and only 12% required state certification.

Research to determine appropriate curriculum for the gifted child has been meager with a paucity of evidence regarding effectiveness (VanTassel-Baska, 1988a). Gallagher and Weiss (1982) noted that research has failed convincingly to demonstrate program effectiveness with gifted students in comparison to other groups. Using survey information given by state directors of gifted education combined with a review of the literature, Gallagher et al. (1983) concluded that there was a serious need for a systematic effort to improve the evaluation of gifted programs. Data from the national study reported by Cox et al. (1987) revealed that only 69% of the school districts responded that program evaluation was a regular procedure. Traxler (1987) conducted a national review on program evaluations for 1982-83 and found one-half of the 192 randomly selected districts surveyed had no program evaluation. A few evaluations had been conducted by trained evaluators.

Evaluation studies of gifted programs that focused on creativity training (Covington, Crutchfield, Davies, & Olton, 1976; Khatena & Dickerson, 1973) suggested that creative thinking skills enumerated in the program could be improved. In a review of creativity training programs, Mansfield, Busse, and Krepelka (1978) concluded that though performance in creativity increased, the transfer of such skills was not addressed and most of the evidence of improved performance was collected using instruments with criterion measures comparable to the training exercises.

Evaluation studies of gifted programs that focused on creative and/or cognitive skills training have been reported. Using a control group, Schlichter (1981) recorded significant differences due to program treatment in creative thinking, self-esteem, and standard achievement. Using subjective ratings Hanninen (1981) reported favorable findings to support the development of independent learning skills and creative expression in gifted students in regular classrooms. Anthony, Iwanicki, and Spears (1977) evaluated the Enrichment Triad and Revolving Door Model (Renzulli, 1977), a program devoted to the development of research and investigative skills for the top 25 percent of a student body, and reported high ratings in achievement and teacher ratings. Kolloff and Feldhusen (1981) evaluated the Three Stage Model (Feldhusen & Kolloff, 1978), a

program devoted to the development of basic thinking skills, creative thinking, and problem-solving abilities. Ratings were positive by teachers and students. Significant gains in self-esteem were recorded by Robinson (1980), who evaluated a resource room program for upper elementary gifted students with program goals to enhance self-esteem, interest in school, and creative potential.

Higher Level Thinking Skills

A program goal of the study, the development of higher level thinking, has been a frequently stated instructional goal in general as well as gifted education. A common approach toward thinking skills instruction has been the development and use of programs that focused on a set of thinking skills. Research studies to determine the effectiveness of thinking skills programs have been criticized for lacking research designs with control groups (Norris, 1985; Sternberg & Bhana, 1986); relying on testing instruments that cannot effectively address the curriculum (Nickerson, 1984; Sternberg & Bhana, 1986); failing to address the appropriate transfer of thinking skills (Sternberg & Bhana, 1986); and failing to do follow-up studies to assess the durability of the training (Norris, 1985; Sternberg & Bhana, 1986). Some evidence to suggest the effectiveness of the more frequently used programs was available. In an evaluation study using fifth graders, Lipman

(1985), developer of Philosophy for Children as well as program evaluator, reported the use of a control group and significant growth gains for the experimental group that endured for two years.

Sternberg & Bhana (1986) reviewed 38 studies of Instrumental Enrichment (Feuerstein, 1980) and reported mixed findings on this program designed to teach thinking skills and then provide opportunities for the transfer of the skill to real world problem-solving. The reviewers concluded that when carefully implemented, Instructional Enrichment might contribute to growth gains on standard IQ and aptitude measures in areas such as abstract reasoning and spatial visualization.

First used in Venezuela as Project Intelligence and now referred to as Odyssey: A Curriculum for Thinking (Herrnstein, Nickerson, Sanchez, & Swets, 1986), the evaluation results were positive that the program can contribute to growth gains in thinking skills. The SOI (Structure of the Intellect) program (Meeker, 1969) was based on Guilford's (1967) Structure-of-the-Intellect theory. The program, often used with gifted students, offered exercises to enhance cognitive skills similar to those measured on IQ tests. Meeker (1969) provided the Structure of Intellect-Learning Abilities Test to be used as the pre- and posttest to determine skill deficits.

Exercises were provided for the deficit areas before the students were re-evaluated. Sternberg and Bhana (1986) reviewed 21 studies of the SOI program and concluded that some gains were achieved from pre- to posttest.

The data from recent gifted program evaluations suggested that gifted students can show growth gains as a result of program treatment in higher level thinking skills. Two studies (Ebmeier, Dyche, Taylor, & Hall, 1985; Nielsen, 1984) evaluated elementary pull-out enrichment programs using quasi-experimental research designs and recorded significant growth in critical thinking skills as measured by the Ross Test of Higher Cognitive Processes. Nielsen (1984) used students identified as potential candidates but chose not to participate in the program to serve as the control group. Ebmeier et al. (1985) randomly assigned the students to two groups and divided the curriculum in two sections; therefore, each group served as a control group for the other group receiving the program treatment.

Using an experimental research design, VanTassel-Baska, Willis, and Meyer (1989) conducted a program evaluation study using a control group. For one year, third and fourth grade students identified as gifted in academic ability using multiple criteria were assigned to a full-time program with a stated goal to improve critical thinking and inquiry. Analysis

of covariance on the pre- and posttest results of the Ross Test suggested a positive effect. For the overall Ross posttest results, mean scores were significantly higher ($p<.05$) for the treatment group in the posttest results of the analysis subscale of the Ross test when compared to the control group.

In summary, thinking skills programs designed to focus on levels of thinking have been evaluated in general education as well as in gifted programs with evidence to suggest that student growth gains might occur.

Creative Thinking Skills

Using findings from a meta-analysis of 46 studies on the effectiveness of creativity training, Rose and Lin (1984) suggested significant growth in gifted students can be measured and that verbal creativity might be more affected by training than figural creativity. Clasen and Subkoviak (1982) concluded that an enrichment program can enhance the creative thinking skills of fluency, flexibility, and originality.

Lutfiyya (1977), evaluated an enrichment program, grades 4-12, with a goal to enhance creativity. A control group of gifted students did not attend the program. Using the Torrance Tests of Creative Thinking, Figural Forms A and B (Torrance, 1974), the researcher grouped the subjects by levels i.e., Elementary (grades 4-7), Junior High (grades 8-9), and Senior High (grades 10-12). Results of the t test were

significant at the .05 level of significance for each level of students who attended the enrichment program.

Using a One-Group Pretest-Posttest design, Fults (1980) evaluated an elementary gifted enrichment program, grades 4-6, to determine student growth in creative thinking skills of fluency, flexibility, originality, and elaboration as measured by the Torrance Tests of Creative Thinking, Figural Forms A and B (Torrance, 1974). Statistically significant differences at the .05 level were recorded.

Kolloff (1983) conducted a program evaluation of a pull-out enrichment program for gifted students, grades 3-6, to measure student growth in creative thinking skills of fluency, flexibility, originality, and elaboration using the Wallach-Kogan Creativity Test (Wallach & Kogan, 1965). Three of the four subtests, verbal fluency, verbal originality, and figural originality yielded significant main treatment effects.

Similarities have existed in gifted program development and evaluation of thinking skills programs, higher level thinking as well as creative thinking. For both sets of skills, evidence has been cited to document student growth gains when the programs focused on the singular goal of teaching a particular set of skills.

Self-Concept

A review of studies to determine the impact of the administrative organization on self-concepts of gifted students has yielded conflicting evidence; however, recent research studies have cited supporting evidence that program treatment may contribute to the maintenance or growth in self-concept (Kolloff, 1983; Nielsen, 1984). Using the Piers-Harris Children's Self-Concept Scale (Piers, 1969) negative results were reported in two studies. Stopper (1978) compared students, grades 2, 4, and 6, in the academically talented program to gifted students in the regular education program. She noted an increasingly negative pattern emerging for students in gifted programs especially for males in all grades and both males and females in grade six. Rogers (1979) compared 39 gifted elementary students in an enrichment program for one day each week and 33 gifted students not receiving programming. The scores for the gifted students in the pull-out program declined, and the researchers speculated that the decline was the result of missing one day of regular classes along with the increased expectations of these students.

In several studies measuring the impact of the administrative organization for program delivery, no significant differences in self-concept were recorded as measured by the Piers-Harris Children's Self-Concept Scale. Karnes and Wherry

(1981) using gifted students, grades 4-7, compared 90 students assigned to a resource program with 58 students in regular classrooms and recorded no significant differences regarding grade level, sex, or program assignment. Maddux, Scheiber, and Bass (1982) compared a full-time segregated program, a pull-out program for three hours each day, and no program treatment for gifted students, grades 5-6. For the sample of 110 students no significant differences were recorded among the groups.

McCarthy (1981) compared gifted students, grades 4-6, who attended pull-out programs for approximately six hours each week with students in the regular classroom. Time out of the classroom at a given period varied, three times a week, two times a week, or daily. No significant differences were reported.

Harty, Adkins, and Hungate (1984) compared gifted students, grade 2-5, assigned to a full-time program, a part-time resource program, and to no program treatment. Though no significant differences were found among the groups, the mean scores of students in the part-time program were slightly higher than those for students in the full-time program.

Chan (1988) studied the perceived competence of intellectually gifted students, grades 5-7, assigned to full-time

segregated programs and part-time enrichment programs. The rating scale was adapted from Harter's Perceived Competence Scale for Children (1982) and assessed perceived competence in four dimensions: cognitive competence, social competence, physical competence, and general self-worth. The gifted students had higher perceived competence than nongifted peers regardless of the delivery system. Full-time students had relatively lower perceived cognitive and physical competence than those in extension programs.

Ketcham and Snyder (1977) posed the question of whether self-concepts of students, grades 2-4, of high IQ and social status in a prestigious college preparatory school differ from the average population of the same age as measured by the Piers-Harris Children's Self-Concept Scale and whether the environment of the school fostered growth in self-concept. The means of college preparatory students and those of the normative population were almost 1 SD apart, favoring the college preparatory students. The researchers concluded that the school philosophy fosters a school environment characterized by acceptance of personal uniqueness. Such a supportive learning environment combined with strong parental support appears to foster and sustain strong self-concepts.

Janos, Fung, and Robinson (1985) conducted a study using high IQ children who reported thinking of themselves as being different from their agemates. They examined the impact of those feelings of being different on the students' self-concepts. The researchers designed and administered a questionnaire to 271 gifted students and 37% of these students saw themselves as different in some way. Given the Piers-Harris Children's Self-Concept Scale, the mean for the group that perceived themselves as different was above the normative sample for the Piers-Harris but lower than that of those students who did not perceive themselves as different. The evidence pointed to the need to address the psychosocial needs of gifted students and to increase psychological support if they are to optimize their personal and social development.

In a series of studies by Fults (Coleman & Fults, 1982, 1983; Fults, 1980) the evidence suggested that participation in gifted programs negatively affected self-concept. Fults (1980) used the Piers-Harris Children's Self-Concept Scale to evaluate an experimental curriculum with a stated goal to emphasize affective skills to enhance self-concept. Selected gifted students, grades 4-6, received the program treatment while a control group did not. She concluded that the self-concepts of elementary students in the intermediate grade may decrease with participation in a gifted program.

As a follow-up, Coleman and Fults (1982) administered the Piers-Harris Scale a third time after the posttest was given to the fifth graders. As sixth graders, the gifted students had not participated in the pull-out program for eight months. These students had lower self-concepts compared with their high achieving peers at the conclusion of the initial study; yet, eight months later the differences were gone with the gifted students scoring higher than the less intelligent peers. These findings suggested the negative influences of the administrative organization might be transitory. Gifted students might compare themselves negatively when the comparison group was other gifted students in the program. If given a different peer group for comparison, the students might view themselves more positively.

Coleman and Fults (1983) examined self-concepts of fourth grade gifted students participating in a gifted enrichment program. The students were in two groups according to IQ scores. When scores from the Piers-Harris Scale were compared, results indicated that students with higher IQ scores increased in self-concept and those with lower IQ scores declined. In conclusion, they offered that for some gifted students, placement in a special class for part of the time might result in lower self-concepts.

Kolloff (1983) evaluated an enrichment program for gifted students, grades 4-6, with the stated program goal to develop and maintain positive self-concepts through interaction with other gifted students. Using the ME Scale and the Piers-Harris Children's Self-Concept Scale in a pre- and posttest design, there was no significant growth as a result of program treatment as measured by either scale. The pull-out program did not affect the students' self-concepts positively or negatively. She concluded that students can maintain positive self-concepts through a systematic program with clearly stated goals.

Nielsen (1984) evaluated a pull-out program for rural gifted students, grades 3-8, with a stated program goal to enhance self-concept. Using the Piers-Harris Scale and the ME Scale as a pre- and posttest in the quasi-experimental design, there were no significant differences with the self-concepts of the elementary program participants and nonparticipants in grades 3-6 as measured by the Piers-Harris Scale. There was a significant difference ($p<.05$) as measured by the ME Scale.

In summary, conflicting evidence was found regarding influences, positive and negative, on the self-concepts of gifted students. While Rogers (1979) and Stopper (1978) offered that attendance in a pull-out gifted program contributed to a negative self-concept, other researchers (Karnes & Wherry,

1981; Maddux et al., 1982; and McCarthy, 1981) reported no significant differences. Though not significant, Harty et al. (1984) and Chan (1988) found some evidence to suggest that students attending full-time programs had slightly lower self-concepts. Other studies found that gifted students in a pull-out program developed negative self-concepts and later, in a regular classroom, had higher self-concepts (Coleman & Fults, 1982, 1983; Fults, 1980).

Research Skills

Enrichment programs for gifted students such as The Purdue Three-Stage Model for Gifted Education (Feldhusen & Kolloff, 1978; Kolloff & Feldhusen, 1981) or The Enrichment Triad (Renzulli, 1977) have included a research skills strand to enable students to pursue independent studies. Such programs have begun with an emphasis on creative thinking (fluency, flexibility, originality, and elaboration); progressed to creative problem solving activities; and concluded with the development and practice of research skills, scientific as well as social science, to pursue independent studies. Program evaluators previously cited have measured student outcomes in creative thinking skills, but few studies using student outcomes to determine the effectiveness of a research skills strand of a gifted curriculum have been cited in the literature.

Nielsen (1984) evaluated a program based on the Three-Stage Model. She gave students, grades 3-6, participating in a pull-out program a questionnaire to evaluate the independent study as a program goal. The students expressed personal satisfaction as a result of doing the independent activities and projects. Results from questionnaires given to administrators, teachers, and parents suggested that the students increased their ability to do research.

Carter (1986a) divided gifted third graders into two groups to serve as control groups for each other in order to evaluate a research skills program treatment. There was inconclusive evidence to suggest that one group out performed the other using criterion-referenced measures to evaluate an independent study. Tamsberg (1987), using a similar research design, evaluated the research skills taught through course content to gifted students in grades 3-8. Students in each grade level were administered a teacher criterion-referenced test on the 14 research skills found in the curriculum guide. the Comprehensive Test of Basic Skills was administered in grades four, five, and seven. Selected items from the testing of Study Skills and Critical Thinking were used at all grade levels. At grade levels three, six, and eight, students showed significant growth in research skills as measured by the

teacher criterion-referenced tests ($p<.05$); while the Comprehensive Test of Basic Skills and testing of Study Skills and Critical Thinking did not yield evidence of significant growth (Tamsberg, 1987). Results indicated a strong support for the use of criterion-referenced testing in a research design to determine program effectiveness for a research skills strand.

Research skills or independent study, though often cited as a gifted program goal, have rarely been evaluated. With the exception of Tamsberg (1987) who recorded student growth gains as determined by criterion-referenced testing, most studies collected attitudinal data to assess mastery in research skills.

Administrative Models for Delivery of Instruction

Though little research has examined student impacts due to the administrative organization for the delivery of instruction, recent studies have examined the effectiveness of either full-time programs or pull-out programs. Gallagher et al. (1983) conducted a national survey of program directors and found more than 95% of upper elementary programs were pull-out models. In the study conducted by the Richardson Foundation, 72% of elementary programs were pull-out models (Cox et al., 1987).

In a comparative study Bigelow (1983) recorded significant growth in higher cognitive processes for academically gifted students, grades 4-6, assigned to a five day per week program compared to gifted students assigned to a one day per week program. Gifted students in the one day per week program had significant growth compared to nongifted students in the regular classroom. The one day per week program emphasized higher level thinking skills, problem solving, and creativity taught by a teacher of gifted. The five day per week program featured homogeneous ability grouping and a teacher of the gifted who enriched the standard curriculum by integrating higher level thinking skills, problem solving, and creativity.

In models where students miss one day per week, Davison (1985) reported regular classroom teachers' concerns because students miss 20% of their class. Lym & Rick (1980) conducted a study to determine the effect of the participation of gifted students, grades 4-6, one day each week in a resource room enrichment program as measured by the Cognitive Abilities Test and concluded that there was accelerated development of cognitive skills involving the manipulation of verbal, numerical, and spatial symbols.

Several researchers (Bigelow, 1983; Fenuele, 1985; VanTassel-Baska et al., 1989) cited evidence of higher

academic achievement and growth in higher level thinking skills to support the effectiveness of full-time programs. Kramer (1987) reported no significant results, quantitative or qualitative, favoring a given program when a self-contained program was compared with a pull-out program. Carter (1986b) used surveys to assess what effects pull-out programs had on gifted students regarding elitism, social interaction, and peer/teacher expectation. Results suggested perceptions were neutral or supportive of pull-out programs.

In a study with an administrative organization for the delivery of instruction comparable to that of the present study, McPherson (1984) combined pull-out and school enrichment for a comprehensive program treatment. Gifted students in the fifth grade exposed to the curricular treatment of the regular classroom combined with the pull-out program did not show significant growth in higher cognitive abilities as measured by the Ross Test of Higher Cognitive Processes when compared to gifted fourth graders who only attended a resource program five hours per week. The combined curricular treatment impacted significantly on students' growth in achievement as measured by the Metropolitan Achievement Tests. There was no positive or negative impact as a result of the curricular treatment for nongifted students.

While most of the research focused on the effectiveness of one administrative organization or another, Bigelow (1983) reported evidence that suggested students assigned to a full-time program achieved significant growth compared to students assigned to a pull-out program. McPherson (1984) evaluated a program with a combination of pull-out and school enrichment comparable to the present study and did not find significant student growth gains in higher level thinking as measured by the Ross Test of Higher Cognitive Processes.

Teacher Training

Several gifted program evaluation studies cited the need for further research to determine how inservice training programs for teachers of gifted as well as regular classroom teachers impacted on students' growth (Fults, 1980; McCarthy, 1981; McPherson, 1984). A major research question for this study suggested the comparison of the impact of the teacher training program on students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills. With a lack of studies in gifted education that focused on staff development, studies from general education that focused on effective designs for staff development and research on models of teaching have been reviewed. Findings in the recent literature on staff development in general education have been summarized.

A good staff development design has four major components: theory, demonstration, practice, and feedback (Showers, Joyce, & Bennett, 1987). The design for training in staff development makes the difference rather than such variables related to the organization of staff development as the social context, the involvement or lack of involvement of governing bodies, the site for training, the time, and who conducts the training. Competent teachers with high self-esteem have usually benefited more from training while flexibility in thinking helps teachers learn new skills and incorporate them in their experience (Showers et al., 1987).

In a study synthesizing the research in staff development Joyce, Showers, & Rolheiser-Bennett (1987) used the concept of effect size or the comparison of outcome measures for control groups and experimental groups expressed as a difference in standard deviation units (Glass, 1981) to demonstrate effectiveness. An effect size of an average of 3.0 was determined with models of staff development that effectively combined theory, demonstration, practice, and feedback while training-only models tended to generate an effect size of about .7 (Showers et al., 1987). Practice and feedback were stressed with about 25 teaching episodes needed to practice a complex model of teaching before the conditions of transfer are achieved (Showers et al., 1987).

Joyce et al. (1987) grouped the teaching models in four groups: (1) social, (2) personal, (3) information processing, and (4) behavioral systems. Reviewing studies on social models or cooperative learning, Rolheiser-Bennett (1986) concluded that the more complex the outcome of higher order processing of information, problem solving, social skills, and attitudes, the greater the effects. In addition, behavior changes included increased feelings of empathy, reduced intergroup tension, reduced antisocial behavior, and increased positive feelings toward one another. Information processing models showed promise, particularly those that enabled students to collect and organize information conceptually or those models that taught students to use the methods of the discipline to engage in causal reasoning to master concepts (Joyce et al., 1987). In a review of personal models or student-centered models that stress creative thinking, the researchers concluded that a teaching model that uses strategies to encourage divergent thinking as well as to enhance self-concepts of students would contribute to student achievement (Joyce et al., 1987).

Spangler (1985) reviewed the literature related to the characteristics of adult learners, concepts of staff development, and content related to the psychological and educational needs of the gifted essential to staff development in order to develop

a scheme for staff development in gifted education. She found that adult learners are motivated to learn when physical and psychological needs are addressed and they respond best to problem solving situations complete with opportunities to practice skills and use knowledge. Spangler (1985) concluded that school districts could with collaborative, systematic planning develop inservice programs with specific objectives and stated outcomes to improve the program by improving teacher performance.

Wood and Leadbeater (1986) stressed a structure of staff development with different stages of entry and involvement as determined by both the clients' needs and their responsibilities in relation to their roles in gifted education (i.e., administrators, teachers, pupil support personnel, or parents).

Adkins and Harty (1984) used a modified time series approach to study the influence of inservice preparation on teachers' attitudes and perceptions. The 12 teachers were given a pretest, a posttest at the end of seven months of inservice, and a final assessment 19 months later. Results of the study suggested that as the teachers perceived themselves more competent, their attitudes became more positive, and they had increased interest in improving gifted education.

Hanninen (1988) asked teachers with varying levels of training to respond to scenarios from case studies. The purpose

of the study was to determine if expert teachers possessing a large body of knowledge and procedural skills differed from the novice teacher with no experience in how they perceived possible solutions for providing for gifted students in the regular classroom. Differences were observed with expert teachers using knowledge as well as theoretical models of teaching that differed from those of novice teachers and that might easily be incorporated in staff development plans for teachers.

Most of what we know about effective staff development has come from general education. However, survey results have documented the need for staff development in gifted education (Cox et al., 1987; Gallagher et al., 1983; Traxler, 1987), models are being developed (Spangler, 1985; Wood & Leadbeater, 1986), and a few studies have addressed the effectiveness of staff development in gifted education (Adkins & Harty, 1984; Hanninen, 1988).

Summary

The review of the literature has supported the need to explore the three research questions in the present study that have addressed curriculum effectiveness, administrative organizations, and teacher training in a gifted program. Gifted program goals to enhance higher level thinking, creative thinking, self-concept, and research skills have been supported

in this review and some evidence has been collected to document the effectiveness of such goals using student growth gains. No evidence was found to show significant student growth gains in higher level thinking, creative thinking, self concept, or research skills as a result of an administrative organization comparable to that of the present study which combined pull-out and school-based enrichment. Additionally, the present study was among the first to address the impact of teacher training using student growth gains.

Chapter 3

Methodology

Population and the Sample

The context for the program under study was an urban school division with a total population of 21,000. There were approximately 2,900 fourth and fifth graders. Beginning the 1988-89 school year, a total of 88 fourth graders and 81 fifth graders identified as gifted in general intellectual ability attended the pull-out program. A total of 112 students (70 fourth graders and 42 fifth graders) were included in the sample for this study. There were 61 males and 51 females. There were 85 white students, 25 black students, 1 Hispanic, and 1 Asian student.

The students in the study had been identified as gifted in general intellectual ability by the school identification placement committee consisting of the building principal, the classroom teacher, and a member of the gifted instructional staff. The committee reviewed a minimum of four pieces of data and reached the decision by consensus. Each student was expected to score at or above the 95th percentile on the Slosson Intelligence Test for Adults and Children (1985) or a comparable ability test. In addition, the committee looked for

reading scores at or above the 95th percentile as measured by the Peabody Individual Achievement Test (Dunn & Markwardt, 1970) or a comparable achievement test. Students were expected to have at least a raw score of 50 out of a total of 72 points on the teacher checklist. A parent checklist was reviewed. When the students were referred from an early identification project in the primary grades, the additional nonverbal ability testing as well as the instructional specialists' checklists were also reviewed to document that the student was eligible and should be placed in the gifted program for intellectually able students.

The students in the sample were grouped for comparison based on their assignment to their regular classroom teacher for the 1988-89 school year. In the second year of a three year plan to implement the school-based enrichment program, regular classroom teachers had had different levels of staff development. The 1988-89 school year was the second year of implementation for 18 teachers. Eight of those teachers had the six hours of graduate credit and the six workshops in the division training program. A total of 42 students (Group 1A) were assigned to these teachers. There were 31 fourth graders and 11 fifth graders. Another group of 10 teachers began their second year of implementation with 29 students (Group 1B). These teachers had not completed the staff development

training. There were 20 fourth graders and 9 fifth graders. The third group of the sample (Group 2) was made of 41 students assigned to classroom teachers without any training in the 23 schools throughout the school division. There were 19 fourth graders and 22 fifth graders. Gifted students assigned to teachers who began the staff development in the fall of 1988 were excluded from the sample.

The three comparison groups under study were:

Group 1A: Gifted students who attended the one day pull-out program and were assigned to regular classroom teachers who had completed the staff development, were beginning the second year of the school-based enrichment program, and used the Core Academic Interdisciplinary Curriculum for 90 minutes per day for four days a week. The instruction of science, social studies, mathematics, and language arts was integrated.

Group 1B: Gifted students who attended the one day pull-out program and were assigned to regular classroom teachers who had little training in gifted education, were beginning the second year of the school-based enrichment program, and used the Core Academic Interdisciplinary Curriculum for 90 minutes per day for four days a week. The

instruction of social studies, science, mathematics, and language arts was integrated.

Group 2: Gifted students who attended the one day pull-out program and were assigned to regular classroom teachers who had not begun staff development and did not use the interdisciplinary curriculum in the classroom. Teachers taught each subject in a given block of time.

The division staff development model was a combination of graduate courses (six credit hours) and division training (18 inservice hours). The first course focused on the nature and needs of gifted students. The second course examined curriculum models and teaching strategies. The division training model conducted by gifted instructional specialists assisted by the core academic curriculum specialists and the gifted program coordinator consisted of six workshops and monthly follow-up sessions. Workshop topics included the following: (1) interdisciplinary instruction, (2) differentiation of instruction, (3) questioning, (4) creative thinking, (5) affective psychosocial needs, and (6) cooperative learning. The monthly meetings, organized by grade level, allowed the instructional specialists to meet with school-based teachers to plan instruction, share instructional strategies, discuss the

needs of their gifted students, or the instructional specialists taught demonstration lessons.

The sample of teachers for the study included two groups: school-based enrichment teachers and gifted instructional specialists. Ten school-based enrichment teachers had received limited training in gifted education (three or less graduate credits combined with little or no division training). Other school-based enrichment teachers (n = 8) had received six graduate hours combined with a total of six division workshops in gifted education. Both groups of school-based enrichment teachers, however, were equivalent on other factors (see Table 1).

Gifted instructional specialists all had a minimum of six graduate hours in gifted education with the average being 10.2 credits per teacher. The average age of the gifted instructional specialists was 38 years and the average years of teaching experience was 11 years. Experience teaching in the pull-out program ranged from one year to seven years. The average for the years of teaching gifted students was 3.5 years. Two teachers were working on master's degrees. The range of background for these teachers is reported in Table 2.

Table 1

School-Based Enrichment Teachers

Group	Average Age	Average Years Teaching	Number Master's Degrees
IA	43.6	18	3
IB	43.3	19	3

Table 2

Gifted Instructional Specialists

Teacher	Age	Experience Teaching	Years GAIN	Graduate Credits Gifted
A	36	14	7	15
B	42	21	2	9
C	44	22	4	12
D	30	8	1	6

Procedure

The groups of gifted students receiving different program treatment while assigned to teachers with varying amounts of staff development evolved naturally in the second year of a three-year implementation plan to achieve a combination of school-based enrichment and a pull-out for students gifted in general intellectual ability. All fourth and fifth grade students identified as gifted in general intellectual ability were given pre- and posttest measures to determine student growth in skills in the four major strands of the curriculum: higher level thinking, creative thinking, self-concept, and research skills. Permission for testing was obtained for each student.

All evaluation instruments were administered in group testing sessions by one of the four instructional specialists in the gifted center. These teachers worked with gifted students one day each week. Each testing session lasted approximately one hour. The teachers conducted sessions on each day of instruction over a three week period.

The first test given, the Ross Test of Higher Cognitive Processes (Ross & Ross, 1976), measured higher level thinking skills and was administered over a two week period. The first five sections totaling sixty-three minutes of testing time were administered and the following week the last three sections totaling fifty-eight minutes of testing time were given.

On the third day of testing, two instruments were administered. First, the Wallach-Kogan Creativity Instrument (Wallach & Kogan, 1965) to measure the creative thinking skills, fluency and originality of ideas, was given. The tasks on the verbal section were presented one at a time for five minutes each for a total of fifty-five minutes. Later in the day, the students were given the figural tasks for a total of forty minutes. As recommended, a game-like atmosphere was created. The students responded to a total of 11 verbal items categorized as instances, alternative uses, and similarities. The students were presented with eight figural items, four pattern and four line. Each figure was reproduced on a separate piece of paper so the student could manipulate the drawing.

Later in the day the ME: A Self-Concept Scale for Gifted Students (Feldhusen & Kolloff, 1981), an untimed test which takes a short time to administer was given. The students only have to write "A" for agree or "D" for disagree as they respond to 40 statements about how they feel.

In the fall the instructional specialist responsible for instruction at her center determined the skill level of each student by completing the GAIN Teacher Assessment of Student Research Skills, Grades 4-5. The same teacher reassessed the students in the spring. All assessment instruments were hand scored locally, carefully following

directions by the author. The Wallach-Kogan Instrument was scored by a teacher with training to score the tests.

Instrumentation

The Ross Test of Higher Cognitive Processes (Ross & Ross, 1976) has been used to measure higher level thinking skills. It was normed using a gifted population. Reliability data were determined utilizing test-retest and split-half procedures. Internal consistency determined by split-half reliability procedures yielded a Pearson product-moment correlation coefficient calculated using students' scores on the odd- and even-numbered test items. This statistic was then adjusted by applying the Spearman-Brown prophecy formula. The resulting split-half reliability coefficient was .92, significant at better than the .001 level of confidence. Using the Pearson product-moment formula temporal stability was determined by the test-retest method and yielded a reliability coefficient of .94, significant at well beyond the .001 level of confidence (Ross and Ross, 1976).

Construct validity was determined by correlation of total score with students' chronological ages, age differentiation, group (gifted vs. nongifted) differentiation and correlation with an intelligence test. When the relationship of chronological age and the performance on the Ross Test was studied, evidence suggested that the development of the higher level thinking

skills of analysis, synthesis, and evaluation is positively related to chronological age. The correlation was found to be $r = .674$, indicating a highly significant relationship. The age-differentiation method of construct validity showed the test to be related to chronological age. The performance of the gifted students on the Ross Test was superior to that of the nongifted with all differences being statistically significant at the .05 level of confidence or better (Ross & Ross, 1976).

The Wallach-Kogan Instrument (Wallach & Kogan, 1965) has been used as a research instrument to examine individual differences in creative thinking. The instrument has five tasks and a total of 39 items. Administered individually in a game-like atmosphere without time constraints, the student responded with as many ideas as possible when given, one by one, the tasks: Instances, Similarities, Alternative Uses, Pattern Meanings, and Line Meanings. The instrument was scored for fluency defined as the total number of responses produced for each item and originality or the uniqueness of the responses among the groups of students in the population tested.

Two methods for establishing the reliability of the instrument were used. First, reliability was calculated for the two measures (number and uniqueness) of each of the five tasks using the Spearman-Brown prophecy formula. The split-half reliabilities for the ten variables ranged from .51

to .93. All but two of the coefficients exceeded .80. An item analysis was done to determine the extent to which each item contributed to the total score for the sum of all items. All of the item-sum correlations are .40 or higher and all but seven are .60 or higher (Kolloff, 1983).

The ME: A Self-Concept Scale for Gifted Students (Feldhusen & Kolloff, 1981) has been used as a research instrument for assessing the self attitudes of gifted students. Using a sample of third through sixth grade gifted students for the initial testing, reliability data included a Kuder-Richardson 20 coefficient of .80. Retest of one-half of the group after a five month period yielded a correlation of .61. The Me Scale and The Piers-Harris Children's Self Concept Scale have been found to have a Pearson Product Moment correlation of .65 for the two instruments (Feldhusen and Kolloff, 1981).

A locally developed rating scale, the GAIN Teacher Assessment of Student Research Skills, Grades 4-5, was used to assess student growth. Using the K-5 Scope and Sequence of Research Skills for the center gifted program, research skills related to the development of an independent study and taught in the 4-5 center program were listed. Each center teacher rated her students' mastery of each skill in the fall and again in the spring to determine student growth.

Research Design

To address curriculum effectiveness, the pretest and posttest scores of each dependent variable were compared to assess student growth. The diagram (O - X - O) depicted the research design for research question one.

A Nonequivalent Control Group Design was used to determine differential effects of the two program delivery models as well as the staff development model. The dependent variables included scores from the following instruments: (1) the Ross Test of Higher Cognitive Processes, (2) the Wallach-Kogan Creativity Instrument, (3) the ME: A Self-Concept Scale for Gifted Students, and (4) the Gain Teacher Assessment of Student Research Skills, Grades 4-5. On the Ross Test and the Wallach-Kogan, subscales were used for data analysis purposes. The total raw scores on the ME Scale and the research skills assessment were used for data analysis purposes.

Program treatment was an independent variable when comparing the full-time program with the pull-out. The following diagram depicted the research design for question two which addressed two different delivery models.

Y1 X1 Y2

YI X2 Y2

Y1 = pretest
Y2 = posttest

X1 = participation in school-based enrichment and a pull-out
X2 = participation in pull-out only

Staff development was the independent variable to compare groups of students instructed by teachers with complete staff development and teachers lacking in staff development. The following diagram depicted the research design for question three which addressed the differential teacher training model.

Y1 X1 Y2

YI X2 Y2

Y1 = pretest
Y2 = posttest

X1 = gifted students assigned to school-based enrichment classroom teachers - complete staff development
X2 = gifted students with school-based enrichment classroom teachers - incomplete staff development

Research Questions and Null Hypotheses

Research Question No. 1: What effect does a specially developed gifted curriculum have on the growth of gifted students in higher level thinking, creative thinking, self-concept, and research skills?

NULL HYPOTHESIS 1: Fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in higher level thinking skills between the fall and spring administration of the Ross Test of Higher Cognitive Processes.

NULL HYPOTHESIS 2: Fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in creative thinking skills between the fall and spring administration of the Wallach-Kogan Creativity Instrument.

NULL HYPOTHESIS 3: Fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in self-concept between the fall and spring administration of the ME: A Self-Concept Scale for Gifted Students.

NULL HYPOTHESIS 4: Fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in research skills between the fall and spring administration of the GAIN Teacher Assessment of Student Research Skills, Grades 4-5.

Research Question No. 2: Which administrative organization, pull-out or a combination of school-based enrichment and pull-out, contributes more effectively toward gifted students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills?

NULL HYPOTHESIS 5: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will not evidence significantly greater growth in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

NULL HYPOTHESIS 6: Fourth and fifth grade gifted students enrolled in a combined school

enrichment and pull-out program (Group 1A) will not evidence significantly greater growth in creative thinking skills as measured by the Wallach-Kogan Creativity Instrument when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

NULL HYPOTHESIS 7: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will not evidence significantly greater growth in self-concept as measured by the ME: A Self-Concept Scale for Gifted Students when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

NULL HYPOTHESIS 8: Fourth and fifth grade gifted students enrolled in a combined school enrichment and pull-out program (Group 1A) will not evidence significantly greater growth in research skills as measured by the GAIN Teacher

Assessment of Student Research Skills, Grades 4-5, when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2).

Research Question 3: What differences in students' growth gains in higher level thinking skills, creative thinking skills, self-concept, and research skills might be attributed to levels of teacher training in gifted education?

NULL HYPOTHESIS 9: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

NULL HYPOTHESIS 10: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in creative thinking skills as measured by the Wallach-Kogan Creativity Instrument when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

NULL HYPOTHESIS 11: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in self-concept as measured by the ME: A Self-Concept Scale for Gifted Students when compared with fourth

and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

NULL HYPOTHESIS 12: Fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in research skills as measured by the GAIN Teacher Assessment of Student Research Skills, Grades 4-5 when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B).

Limitations

The strands of the curriculum in this study were process skills and the selection of appropriate instrumentation for the

purpose of evaluation was limited. Rarely has there been a match of curriculum objectives for gifted learners and norm-referenced tests to address higher level thinking, creative thinking, self-concept, and research skills. Gallagher et al. (1983) noted that the availability and the appropriateness of instruments to measure prevalent program goals in gifted education has been a concern and, therefore, a limitation. The Ross Test of Higher Cognitive Processes (Ross & Ross, 1976) has been selected for program evaluation because it was normed with a gifted population. However, in the development of a local gifted program, it would be difficult to achieve a true curriculum match with such a test.

Several issues emerged when evaluating creativity. To begin with, there were few instruments available and the appropriateness of the instruments was a concern. Problems of validity as well as reliability are documented in the literature (Khatena, 1976; Mansfield et al., 1978; Parnes & Treffinger, 1973; Treffinger and Poggio, 1972). Torrance (1977) raised the problem of intervening factors such as motivational or cultural influences that could impact on students' performances. Finally, the scoring of the Wallach-Kogan was done locally and though the teacher was trained, it was still a subjective decision to award points, particularly for originality.

Instrumentation to assess self-concept presented the concern that the instrument would assess areas that a gifted program in a school setting could not address. The ME Scale: A Self-Concept Scale for Gifted Students (Feldhusen & Kolloff, 1981) was chosen since it had been used to assess self-concept in gifted students in recent studies (Kolloff, 1983; Nielsen, 1984).

The choice of appropriate instrumentation to assess research skills was limited. A recent study (Tamsberg, 1987) suggested that norm-referenced achievement tests were not appropriate to achieve a match with the curriculum. The tasks of the development and validation of criterion tests were prohibitive. Given these restraints, the selection of a locally developed scale was made. In this study four different instructional specialists assessed students whom they taught. Though the teachers as a group were trained in the use of the rating procedure, the potential for variability must be noted.

It should be unethical to withhold services or to manipulate educational settings for gifted students; consequently, there were not enough gifted students within the school division for a sample of students receiving no program treatment to serve as a control group. Rather, a comparative model has been used in this study.

The amount of time devoted to program treatment was limited. First, the time between the pretest and posttest was limited because students attended the gifted center one day each week beginning the first week in October and closing the last week in May. In addition, the total administration time for the testing was approximately four hours and had to be spread over at least four administration periods.

Finally, it should be noted that the researcher was also the program director and had contributed to the development of the program for three years prior to the start of the study.

Summary

The sample consisted of 112 gifted fourth and fifth grade students. The groups of students were determined by the amount of staff development the regular classroom school-based enrichment teacher had had. A total of 42 students (Group 1A) were assigned to eight classroom teachers who were in the second year of the implementation of the school-based enrichment program and had six graduate hours in gifted education combined with the division training. A total of 29 students (Group 1B) were assigned to 10 school-based enrichment classroom teachers who had little training in gifted education. A total of 41 students were assigned to classroom teachers without training and who were not using the Core Academic Interdisciplinary Curriculum.

The instruments used were the following: the Ross Test of Higher Cognitive Processes, the Wallach-Kogan Creativity Instrument, the ME: A Self-Concept Scale for Gifted Students, and the GAIN Teacher Assessment of Student Research Skills, Grades 4-5.

Repeated measures analysis of variance (ANOVA) were run to measure student growth gain as a result of the specially developed gifted curriculum. Repeated measures analysis of covariance (ANCOVA) were run to compare the two program delivery models as well as the differential levels of staff development. The pretest scores of the dependent variables were covariates.

The research questions were:

Research Question No. 1: What effect does a specially developed gifted curriculum have on the growth of gifted students in higher level thinking, creative thinking, self-concept, and research skills?

Research Question No. 2: Which administrative organization, pull-out or a combination of school-based enrichment and pull-out, contributes more effectively toward gifted students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills?

Research Question 3: What differences in students' growth gains in higher level thinking skills, creative thinking skills,

self-concept, and research skills might be attributed to levels of teacher training in gifted education?

Null hypotheses were generated for each question that addressed each dependent measure.

Chapter 4

Results

The purposes of the study were to determine the effects of (1) a specially developed gifted curriculum for grades four and five on gifted learners, (2) two contrasting instructional delivery systems for gifted students, and (3) differential levels of teacher training in gifted education on student outcomes. Student growth was measured in higher level thinking skills, creative thinking skills, self-concept, and research skills. A nonequivalent control group design was used. Repeated measures analyses of variance (ANOVA) were conducted to assess the results of curriculum treatment. The factorial design (2 x 3 x 2) included two between-subjects factors, Grade Level (four and five) and Treatment Group (1A, 1B, and 2), and one within-subjects factor, Time (pretest and posttest). Since the Ross Test and the Wallach-Kogan Test were comprised of several subscales, the subscales were treated as an additional within-subjects factor. Repeated measures analyses of covariance (ANCOVA) were conducted to assess the impact of the program treatments. The factorial design (2 x 3 x 2 x 2) included three between-subjects factors: Grade Level (four and five); Treatment Group (1A, 1B, and 2); Sex (males and

females); and one within-subjects factor, Time (pretest and posttest). When the dependent measures were comprised of several subscales, the subscales were treated as an additional within-subjects factor.

Curriculum Effectiveness

Research question one examined the effects of a specially developed gifted curriculum on the growth of gifted students in higher level thinking, creative thinking, self-concept, and research skills. Repeated measures analyses of variance (ANOVA) were conducted to assess results of the curriculum treatment.

Higher Level Thinking Skills

The results of the repeated measures ANOVA are presented in Appendix A. The Subscale x Time x Group interaction, $F(4, 212) = 3.142$, $p = .015$, yielded significant results and was further analyzed using the Tukey WSD procedure. This analysis included the significant within-subjects effects for the first trials factor, Subscale, $F(2, 212) = 5.234$, $p = .006$, and the second trials factor, Time, $F(1, 106) = 117.982$, $p < .001$, as well as the Subscale x Time interaction $F(2, 212) = 12.720$, $p < .001$.

Analyses of the between-subjects effects, Grade, Group, and Grade x Group, yielded no significant results. Analyses of the within-subjects effects for the first trials factor, Subscale x Grade, Subscale x Group, and Subscale x Grade x Group yielded no

significant results. Analyses of the within-subjects effects for the second trials factor, Time x Grade, Time x Group, and Time x Grade x Group yielded no significant results. Analyses of the within-subjects effects for the trials interaction, Subscale x Time x Grade, and Subscale x Time x Grade x Group yielded no significant results.

Follow-up tests to the ANOVA were conducted for the Subscale x Time x Group interaction. Table 3 presents the pretest and posttest raw means by subscale and group. Group 1A students achieved significant growth in analysis (raw means difference = 13.119) and synthesis (raw means difference = 3.484) but not for evaluation (raw means difference = 1.428). Group 1B students achieved significant growth in analysis (raw means difference = 11.207), synthesis (raw means difference = 5.598), and evaluation (raw means difference = 9.552). Group 2 students achieved significant growth in analysis (raw means difference = 10.609), synthesis (raw means difference = 6.001), and evaluation (raw means difference = 7.939).

Table 3

Ross Pretest and Posttest Raw Means* by Subscale and Group

		Scale		
		Analysis	Synthesis	Evaluation
Group 1A	Pre	98.365	99.865	103.810
	Post	111.484*	103.349*	105.238
Group 1B	Pre	98.183	99.506	99.810
	Post	109.390*	105.104*	109.362*
Group 2	Pre	98.976	98.528	98.988
	Post	109.585*	104.529*	106.927*

* $p<.05$ indicates significant difference from the pretest mean.

Research question one examined the effect of a specially developed gifted curriculum on the growth of gifted students in higher level thinking. The first null hypothesis that fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in higher level thinking skills between the fall and spring administration of the Ross Test of

Higher Cognitive Processes was rejected. With the exception of Group 1A students' performance on the evaluation subscale, each group, 1A, 1B, and 2, achieved significant growth ($p<.05$) on each subscale, analysis, synthesis, and evaluation (see Table 3).

Creative Thinking Skills

Two separate analyses were run (see Appendix B). For originality, the additional within-subjects factor included the subscales, verbal originality and figural originality, and for fluency, the additional within-subjects factor included the subscales, verbal fluency and figural fluency.

The first ANOVA for originality yielded no significant between-subject effects for the following: Grade, Group, or Grade x Group. No significant effects were discovered for the following within-subjects effects for the first trials factor: Subscale, Subscale x Grade, Subscale x Group, or Subscale x Grade x Group. No significant effects were found for the following within-subjects effects for the second trials factor: Time, Time x Grade, Time x Group, and Time x Grade x Group. No significant effects were found for the following within-subjects effects trials interaction: Subscale x Time, Subscale x Time x Grade, Subscale x Time x Group, and Subscale x Time x Grade x Group.

In the analyses of the between-subjects effects for the second ANOVA for fluency, no significant results were found for the following: Grade, Group, or Group x Grade. For the within-subjects effects for the first trials factor, significant results were recorded for Subscale, $F(1, 106) = 167.722$, $p < .001$, and for Subscale x Grade, $F(1, 106) = 15.150$, $p < .001$, while no significant results were recorded for Subscale x Group or Subscale x Group x Grade. For the within-subjects effects for the second trials factor, no significant results were recorded which included the following: Time, Time x Grade, Time x Group, and Time x Group x Grade. Significant results were recorded for the within-subjects effects for the trials interaction, Subscale x Time, $F(1, 106) = 12.452$, $p = .001$. No significant results were recorded for the other trials interactions which included the following: Subscale x Time x Grade, Subscale x Time x Group, and Subscale x Time x Group x Grade.

The Subscale x Time interaction was further analyzed using the Tukey WSD procedure. Table 4 presents the pretest and posttest raw means for fluency. The difference in the pretest and posttest raw means for verbal fluency was not significant; however, the difference for figural fluency was significant (raw means difference = 13.536).

Table 4

Wallach-Kogan Pretest and Posttest Raw Means* for the Subscale Fluency

		Pre	Post
Fluency	Verbal	152.125	149.813
	Figural	97.393	110.929*

* $p<.05$ indicates significant difference from the pretest mean.

Research question one examined the effect of a specially developed gifted curriculum on the growth of gifted students in creative thinking skills. The second null hypothesis that fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in creative thinking skills between the fall and spring administration of the Wallach-Kogan Creativity Instrument was accepted. No significant results were recorded for verbal fluency. In fact, Table 4 comparing the pretest and posttest means for the fluency subscale, verbal as well as figural, shows a slight decrease, though not significant, in the mean from the pretest

(M = 152.125) to the posttest (M = 149.813). Significant growth ($p<.05$) for figural fluency from the pretest (M = 97.393) to the posttest (M = 110.929) was recorded. The ANOVA for originality, which included verbal and figural subscales, yielded no significant results. For three of the subscales, verbal fluency, verbal originality, and figural originality, no significant growth was recorded; thus, the null hypothesis was accepted. The one exception, figural fluency, has been noted.

Self-Concept

The results of the repeated measures ANOVA are presented in Appendix C. The ANOVA yielded no significant results for the between-subjects effects, Grade or Group x Grade. No significant within-subjects effects were revealed for the following: Time, Time x Grade, Time x Group, or Time x Group x Grade. Table 5 gives the raw pretest mean (30.705) and the posttest mean (30.375) for the students (N = 112) in the study. The slight decrease was not significant and no significant student growth gains ($p<.05$) have been recorded.

Table 5

ME Scale Pretest and Posttest Raw Means

N = 112	Raw Mean
Me Pretest	30.705
Me Posttest	30.375

Research question one examined the effect of a specially developed gifted curriculum on the growth of gifted students in self-concept. The third null hypothesis that fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in self-concept between the fall and spring administration of the ME: A Self-Concept Scale for Gifted Students was accepted. The comparison of the raw pretest mean (30.705) and the raw posttest (30.375) in Table 5 yielded no evidences of significant growth ($p<.05$).

Research Skills

The results of the repeated measures ANOVA are presented in Appendix D. All interactions yielded significant effects; therefore, the Time x Group x Grade interaction,

$F(2, 106) = 8.392$, $p < .001$, was further analyzed using the Tukey WSD procedure. Table 6 presents the pretest and posttest raw means for the research skills assessment by grade and group. Grade four as well as grade five students achieved significant growth gains ($p<.05$) regardless of group membership.

Table 6

Research Skills Pretest and Posttest Raw Means* by Grade and Group

		Group		
		1A	1B	2
Grade 4	Pre	200.935	190.950	186.474
	Post	133.032*	129.90*	124.421*
Grade 5	Pre	153.545	126.889	178.682
	Post	104.727*	95.556*	114.682*

* $p<.05$ indicates significant difference from the pretest mean.

Research question one examined the effect of a specially developed gifted curriculum on the growth of gifted students in research skills. The fourth null hypothesis that fourth and fifth grade gifted students enrolled in a gifted program will not show a significant increase in research skills between the fall and spring administration of the GAIN Teacher Assessment of Student Research Skills, Grades 4-5 was rejected. Significant growth ($p<.05$) for each grade level (four and five) in every group (1A, 1B, and 2) was recorded (see Table 6).

Administrative Organization

Research question two compared administrative organizations, pull-out with a combination of school-based enrichment and pull-out, to determine which contributed more effectively toward gifted students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills. Repeated measures ANCOVA were conducted to compare the achievement of the students assigned to the combination of school-based enrichment and pull-out (Group 1A) with that of students assigned to the pull-out (Group 2). The factorial design (2 x 3 x 2 x 2) included three fixed factors: Grade (four and five); Group (1A, 1B, and 2); and Sex (males and females). The within-subjects factor was Time (pretest and posttest). The subscales of the Ross and Wallach-Kogan tests were treated as additional within-subjects factors. The

group members were not randomly assigned; therefore, the pretest scores of the dependent measures were used as covariates to determine what if any difference existed among the groups at the start of the study with regard to the students' performance on the dependent measure in the analysis.

Higher Level Thinking Skills

The results of the ANCOVA are presented in Appendix A. Significant effects for the analysis, $F(1, 97) = 25.595$, $p < .001$, and synthesis, $F(1, 97) = 6.600$, $p = .012$, covariates were found to show that the groups differed significantly ($p<.05$) in their performances on the analysis and synthesis pretests. No significant effect for the evaluation covariate was found to suggest that at the start of the study, the groups were not significantly different with regard to the performance on the evaluation subscale. In addition, significant interaction effects for Subscale x Grade, $F(2, 194) = 4.574$, $p = .011$, and Subscale x Group, $F(4, 194) = 3.076$, $p = .017$, were discovered.

The analyses yielded no significant results for the following between-subjects effects: Grade, Group, Sex, Grade x Group, Grade x Sex, Group x Sex, or Grade x Group x Sex. The analyses yielded no significant interactions for the following: Subscale x Sex, Subscale x Grade x Group, Subscale x Grade x Sex, Subscale x Group x Sex, or Subscale x Grade x Group x Sex.

The Tukey WSD procedure was selected for the follow-up tests. Table 7 presents the adjusted posttest means and ns for the Ross Subscale (analysis, synthesis, and evaluation) x Grade (four and five) interactions. Figure 1 illustrates the interactions found. Fourth grade students scored significantly better on evaluation (M = 108.503) than fifth graders (M = 104.293); however, there were no significant differences in the achievement for fourth and fifth graders on the subscales, analysis or synthesis. Fourth grade students scored significantly better on analysis (M = 110.687) and evaluation (M = 108.503) compared to synthesis (M = 103.669). Grade five students scored significantly better on analysis (M = 109.514) than synthesis (M = 105.178) and evaluation (M = 104.293). An examination of the entry data for all students did not reveal any significant differences in the grade four students' abilities scores nor achievement scores compared to grade five students' scores.

Table 7

Adjusted Posttest Means and ns for Ross Subscales by Grade

	Analysis		Synthesis		Evaluation	
	n	Mean	n	Mean	n	Mean
Grade 4	70	110.687	70	103.669	70	108.503
Grade 5	42	109.514	42	105.178	42	104.293

Figure 1

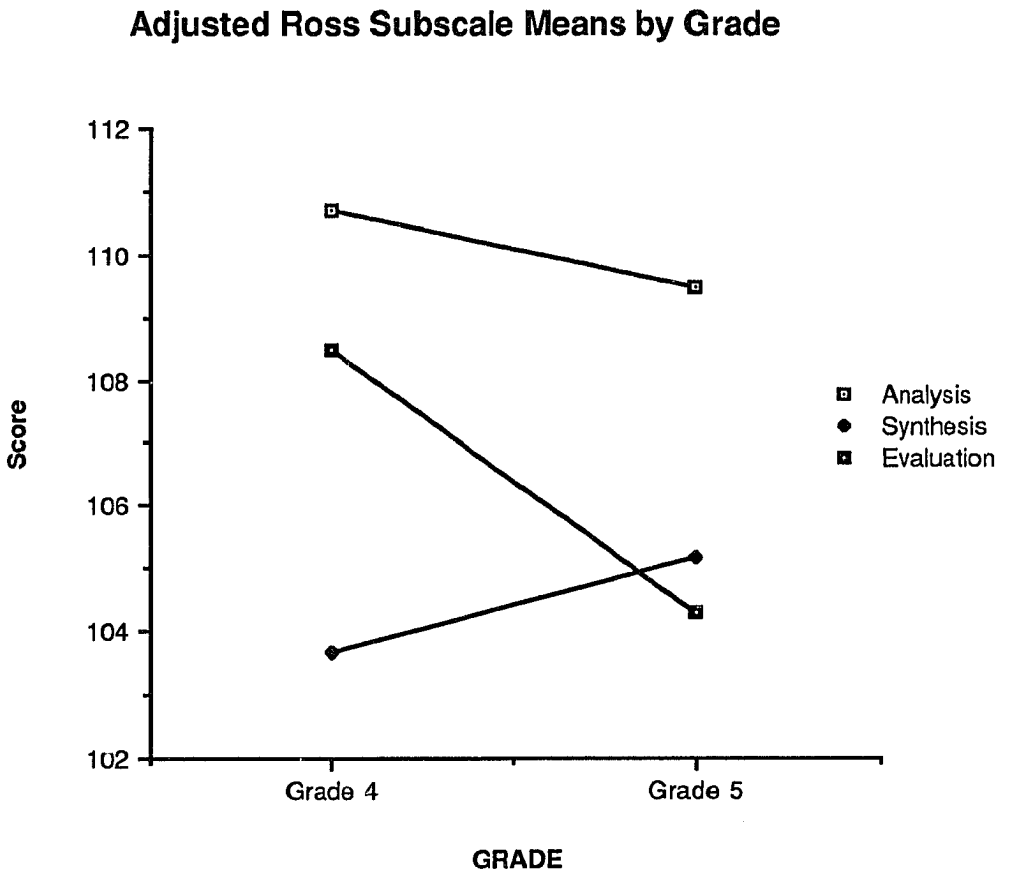


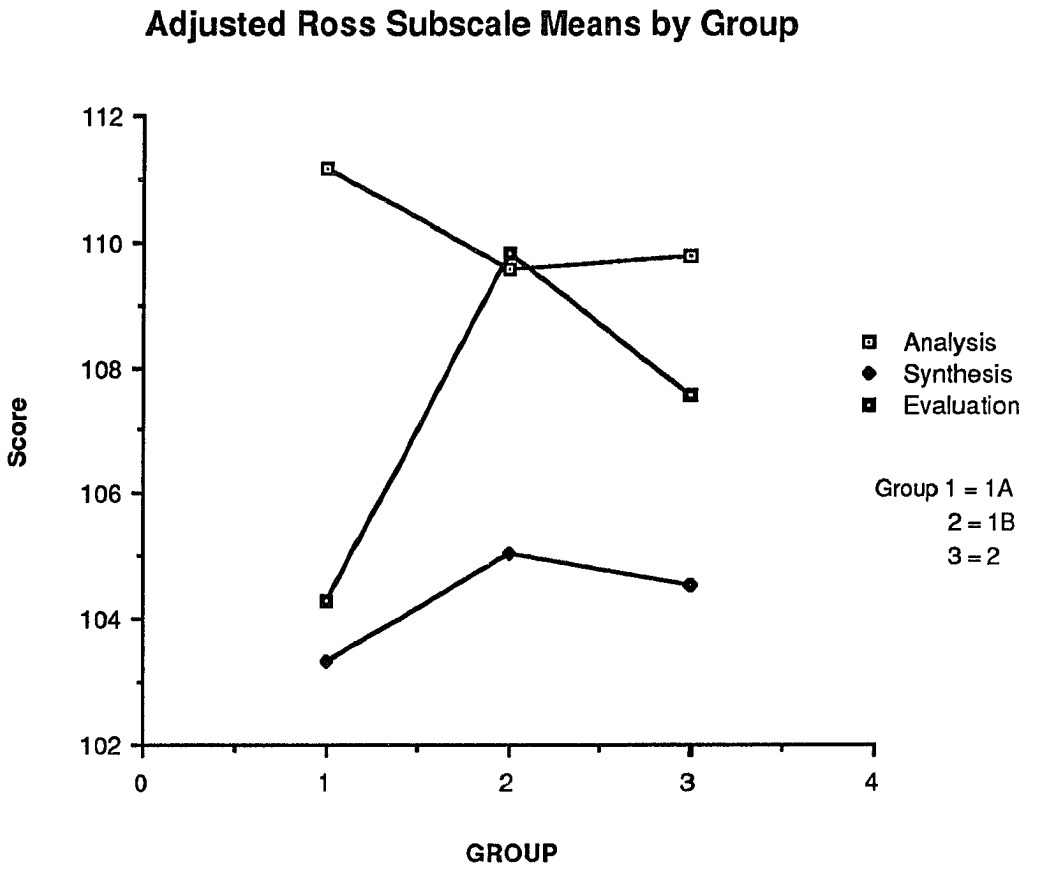
Table 8 presents the adjusted posttest means and ns for the Ross Subscale (analysis, synthesis, and evaluation) by Group (1A and 2) interactions. Figure 2 illustrates the interactions found. Group 1A did not score significantly different from Group 2 on any subscale.

Table 8

Adjusted Posttest Means and ns for Ross Subscales by Group

	Analysis		Synthesis		Evaluation	
	n	Mean	n	Mean	n	Mean
Group						
1A	42	111.183	42	103.350	42	104.315
2	41	109.773	41	104.558	41	107.552

Figure 2



Research question two compared administrative organizations, pull-out and a combination of school-based enrichment and pull-out, to determine which contributed more effectively toward gifted students' growth in higher level thinking skills. Null hypothesis number five that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program (Group 1A) will not evidence significantly greater growth in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2) was accepted.

Creative Thinking Skills

The Wallach-Kogan Creativity Test measured the creative thinking skills of fluency and originality. Each skill was assessed with verbal as well as figural responses. Two separate repeated measures ANCOVA's were run. The results of the ANCOVA with the subscales, verbal fluency and figural fluency, as dependent variables are presented in Appendix B. Significant effects for the verbal fluency, $F(1, 98) = 7.372$, $p = .008$, and figural fluency, $F(1, 98) = 10.977$, $p = .001$, covariates were found to show that the groups were not equivalent at the beginning of the study with regard to the students' performance on the verbal fluency and

figural fluency pretests. The ANCOVA yielded no other significant main effects or interactions.

The results of the ANCOVA with the subscales, verbal originality and figural originality, as dependent variables are presented in Appendix B. Significant effects for the verbal originality, $F(1, 98) = 19.426$, $p < .001$, and figural originality, $F(1, 98) = 10.934$, $p = .001$, covariates were found to show that the groups were not equivalent with regard to the students' performance on the verbal originality and figural originality pretests. The ANCOVA yielded a significant between-subjects effect for Sex, $F(1, 98) = 3.960$, $p = .049$, and a significant within-subjects effect for Subscale x Grade x Sex, $F(1, 98) = 4.052$, $p = .047$.

No significant effects were found for the following between- subjects effects: Grade, Group, Grade x Group, Grade x Sex, Group x Sex, or Grade x Group x Sex. No significant effects were revealed for the following within-subjects effects: Subscale, Subscale x Grade, Subscale x Group, Subscale x Sex, Subscale x Grade x Group, Subscale x Group x Sex, or Subscale x Grade x Group x Sex.

The Tukey WSD procedure was selected for the follow-up tests. The between-subjects effect for Sex was included in the analysis of the within-subjects effect, Level x Grade x Sex. Table 9 gives the adjusted posttest means and ns. Figure 3 illustrates the

interaction found. The points plotted on the graph represent students' sex as well as the scores on the subscales of the dependent variable.

Fourth grade females scored significantly higher on verbal originality (M = 8.548) as well as figural originality (M = 6.903) compared to fourth grade males verbal originality scores (M = 4.949). There were no significant differences in fourth grade female scores on verbal originality compared to figural originality. In grade five, no significant differences were found between male and female scores on verbal originality or figural originality.

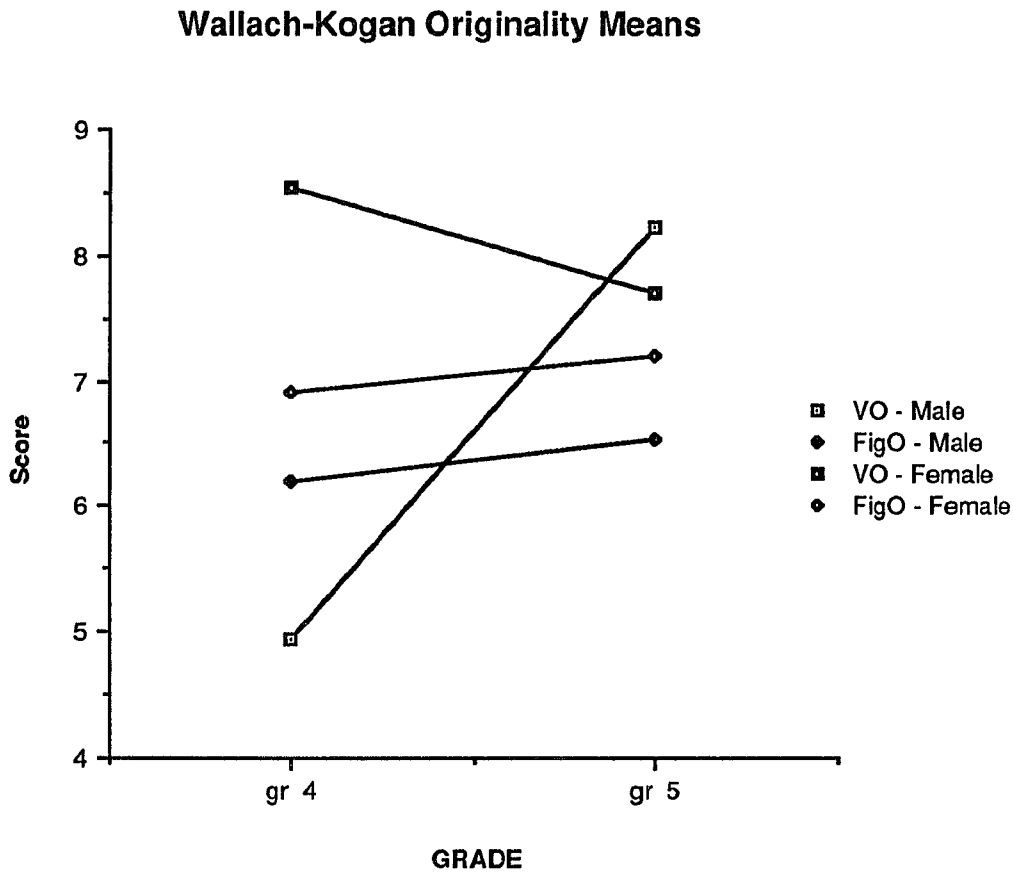
Fifth grade males (M = 8.227) scored significantly higher than fourth grade males (M = 4.949) on verbal originality. No other significant differences were found between grade four and grade five males or females on the subscales, verbal originality or figural originality.

Table 9

Adjusted Posttest Means and ns for Originality Subscale by Grade by Sex

	Verbal Originality		Figural Originality	
	n	Mean	n	Mean
Grade 4				
Males	39	4.949	39	6.205
Females	31	8.548	41	6.903
Grade 5				
Males	22	8.227	22	6.545
Females	20	7.700	20	7.200

Figure 3



Research question two compared the administrative organizations, pull-out and a combination of school-based enrichment and pull-out, to determine which contributed more effectively toward gifted students' growth in creative thinking skills. Null hypothesis number six that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program (Group 1A) will not evidence significantly greater growth in creative thinking skills as measured by the Wallach-Kogan Creativity Instrument when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2) was accepted. Group 1A students did not perform significantly differently ($p<.05$) from Group 2 students on any subscale of the Wallach-Kogan: verbal fluency, verbal originality, figural fluency, and figural originality. Significant differences in the performance of fourth grade females on verbal originality (M = 8.548) and figural originality (M = 6.903) compared to fourth grade males' performance on verbal originality (M = 4.949) were recorded (see Table 9, Figure 3). Fifth grade males (M = 8.227) scored significantly higher than fourth grade males (M = 4.949) on verbal originality (see Table 9, Figure 3). These differences did not translate into significant differences when the fourth and fifth grade males and females were grouped for the purposes of comparison in the study.

Self-Concept

The results of the ANCOVA are presented in Appendix C. Results showed that the Me pretest scores, $F(1, 99) = 50.505$, $p < .001$, were a significant covariate to indicate that the groups were significantly different with regard to their performances on the ME pretest. No significantly different between-subjects' effects were discovered for the following: Grade, Group, and Sex. No significant within-subjects effects were discovered for the following: Grade x Group, Grade x Sex, Group x Sex x Grade, and Grade x Group x Sex.

An examination of the adjusted posttest means of Group 1A ($M = 28.500$) and Group 2 ($M = 32.268$) revealed that the means of the two groups were not significantly different ($p<.05$) (see Table 10). Further examination of the adjusted means for each group revealed that students in Group 1A showed a small decrease when comparing the adjusted pretest mean and adjusted posttest mean. Group 2 showed a slight increase when the means were compared.

Table 10

Adjusted Posttest Means and ns for ME Scale by Group

Group	n	Pretest Mean	Posttest Mean
1A	42	30.048	28.500
2	41	32.049	32.268

Research question two compared the administrative organizations, pull-out and a combination of school-based enrichment and pull-out, to determine which contributed more effectively toward gifted students' growth in self-concept. Null hypothesis number seven that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program (Group 1A) will not evidence significantly greater growth in self-concept as measured by the ME: A Self-Concept Scale for Gifted Students when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2) was accepted. Group 1A students did not perform significantly different ($p<.05$) from Group 2 students on the ME Scale (see Table 10). Though the differences are not

significant ($p<.05$), a slight negative difference between the adjusted pretest (30.048) and posttest (28.500) mean for Group 1A and a slight increase for the Group 2 pretest mean (32.049) to posttest mean (32.268) were recorded.

Research Skills

The results of the ANCOVA are presented in Appendix D. Significant effects for the research skills pretest, $F(1, 99) = 397.377$, $p < .001$, covariate were found to show that the groups differed significantly in their performances on the research skills pretest. Significant results for group, $F(2, 99) = 4.118$, $p = .019$ and an interaction effect for Grade x Group, $F(2, 99) = 3.238$, $p = .043$, were found. No significant effects for Grade or Sex, nor Grade x Sex, Group x Sex, nor Grade x Group x Sex were found.

The Tukey WSD procedure was selected for the follow-up tests. Table 11 gives the adjusted posttest means and ns for group (1A and 2) and grade (four and five). Figure 4 illustrates the interactions found. The significant effect for group is included in the analysis of the interaction, Grade x Group. On the teacher assessment instrument, the best rating on a scale of one through five was one for a specific skill; therefore, the smaller the mean for each group, the better the achievement.

The analysis yielded significant differences between the means of Group 1A ($M = 125.850$) and Group 2 ($M = 116.962$) fifth grade students.

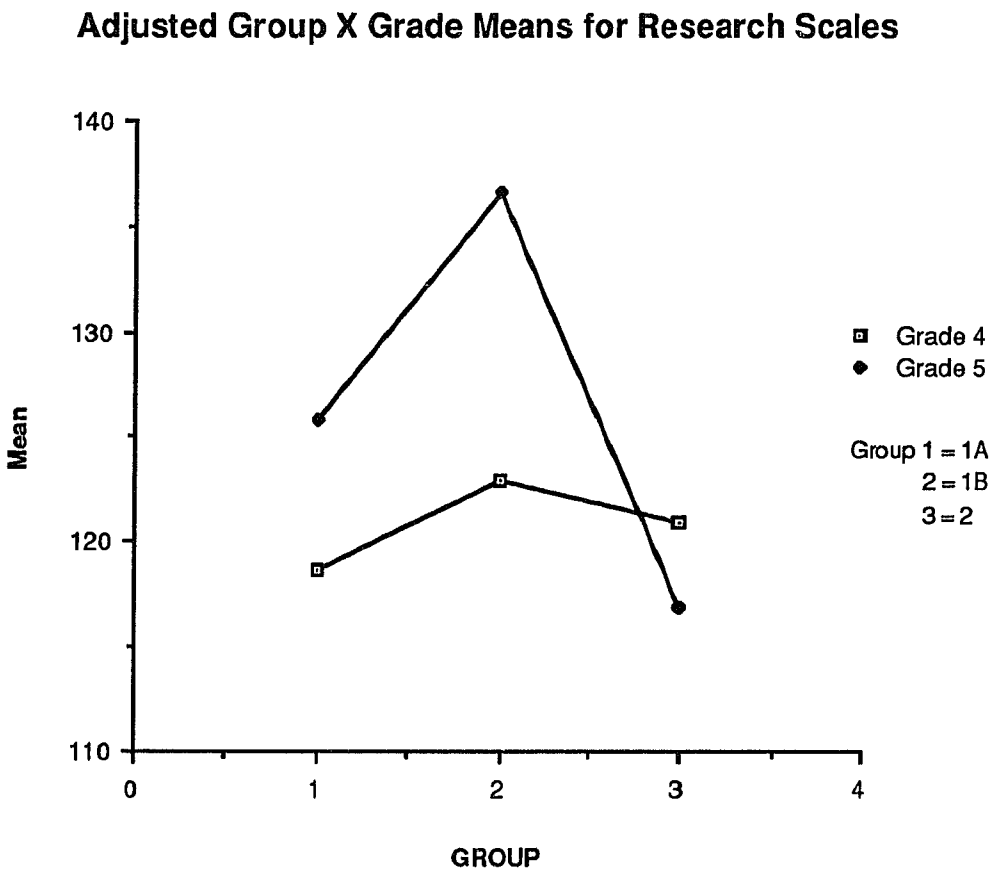
Table 11

Adjusted Posttest Means * and ns for Research Skills by Group by Grade

	Group 1A		Group 2	
	n	Mean	n	Mean
Grade 4	31	118.630	19	120.860
Grade 5	11	125.850	22	116.962

Note: * The smaller the mean, the more growth the students achieved.

Figure 4



Research question two compared the administrative organizations, pull-out and a combination of school-based enrichment and pull-out, to determine which contributed more effectively toward gifted students' growth in research skills. Null hypothesis number eight that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program (Group 1A) will not evidence significantly greater growth in research skills as measured by the GAIN Teacher Assessment of Student Research Skills, Grades 4-5 when compared with fourth and fifth grade gifted students attending a pull-out program (Group 2) was accepted. In fact, contradictory evidence was reported. Group 2 fifth grade students ($\underline{M}$ = 116.962) assigned to a pull-out program scored significantly better ($\underline{p}<.05$) than Group 1A fifth grade students ($\underline{M}$ = 125.850)* who attended a combination of school-based enrichment and a pull-out program.

Further analysis of the data in Table 11 provided some insight into the issue. It was the outstanding performance of the grade five students in Group 2 (m = 116.962), the best of any grade level in any group, that contributed to the results that were contradictory to the research hypothesis. Grade four students significantly outperformed grade five students ($\underline{p}<.05$) in Group 1A, but the grade four students did not achieve significantly differently across the groups. The grade five

students performed significantly different across the groups. An analysis of the pre- to posttest raw means from the follow-up tests to the ANOVA (see Table 6) gave further support. Grade five students in Group 2 achieved a raw mean difference of 64.000 compared to the grade five students in Group 1A who achieved a raw means difference of 48.818. Grade five students in Group 1A showed significant growth ($p<.05$) but the amount of growth was significantly greater for the fifth graders in Group 2.

Teacher Training

Research question three compared student growth gains resulting from differing levels of teacher training. Repeated measures ANCOVA were conducted to compare the achievement of the students assigned to teachers who had completed the teacher training model (Group 1A) with that of students assigned to teachers who had not completed the teacher training model (Group 1B). The factorial design (2 x 3 x 2 x 2) included three fixed factors: Grade (four and five); Groups 1A, 1B, and 2); and Sex (males and females). The within-subjects factor was Time (pretest and posttest). The subscales of the Ross and Wallach-Kogan were treated as additional within-subjects factors. The group members were not randomly assigned; therefore, the pretest scores of the dependent measures were used as covariates to determine

what if any differences existed among the groups at the start of the study with regard to the students' performance on the dependent measure in the analysis.

Higher Level Thinking Skills

The results of the ANCOVA are presented in Appendix A. As previously noted, significant effects ($p<.05$)for the analysis and synthesis covariates were found to show that the groups differed significantly in their performances on the analysis and synthesis pretests. No significant effects were recorded for the evaluation covariate. Significant Subscale x Group interactions, $F(4, 194) = 3.076$, $p = .017$ were discovered.

Table 12 presents adjusted posttest means and ns for the Ross subscale (analysis, synthesis, and evaluation) by group 1A and 1B interactions. Figure 2 (see page 89) represents the interactions. Group 1 B students ($M = 109.816$) scored significantly better than Group 1A students ($M = 104.315$) on evaluation.

Table 12

Adjusted Posttest Means and ns for Ross Subscale by Group

	Analysis		Synthesis		Evaluation	
	n	Mean	n	Mean	n	Mean
Group						
1A	42	111.183	42	103.350	42	104.315
1B	29	109.561	29	105.062	29	109.816

Research question three examined what differences in students' growth gains in higher level thinking might be attributed to differential levels of teacher training in gifted education. Null hypothesis number nine that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a

pull-out program with classroom teachers with incomplete staff development (Group 1B) was accepted.

In fact, Group 1B students (M = 109.816) scored significantly better ($p<.05$) than Group 1A students (M = 104.315) on the evaluation subscale. Further analysis of the data was completed to examine this finding, a contradiction of the research hypothesis. With the Ross pretest scores for the subscale, evaluation, as the covariate, the analysis from the ANCOVA revealed no significant differences in skill development in evaluation existed among the groups of students at the time of pretesting.

The follow-up tests to the ANOVA comparing the raw pretest and posttest means (see Table 3) showed that Group 1A students' scores on the pretest (M = 103.810) were significantly higher ($p<.05$) compared to Group 1B (M = 99.810). Given the significantly higher group means as the baseline for student growth gains, these students did not score well enough on the posttest to show significant growth gains. A comparison of Group 1A student performance on the pretest (M = 103.810) and the posttest (M = 105.238) shows some growth though not significant ($p<.05$).

Creative Thinking Skills

The results of the ANCOVA for both dependent variables, fluency and originality, have been discussed. No main or

interaction effects were recorded for fluency (see Table in Appendix B). The significant interaction effect, Subscale x Grade x Sex, for originality was analyzed to reveal that fourth grade females scored significantly better ($p<.05$) on verbal as well as figural originality compared to fourth grade males' performance on verbal originality; yet, these results did not contribute toward significant differences among the groups.

Research question three examined what differences in students' growth gains in creative thinking might be attributed to differential levels of teacher training in gifted education. Null hypothesis number ten that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in creative thinking skills as measured by the Wallach-Kogan Creativity Instrument when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B) was accepted.

Self-Concept

Results from the ANCOVA indicated that the ME pretest scores, $F(1, 99) = 50.505$, $p < .001$, were a significant covariate to indicate that the groups were significantly different ($p<.05$)

with regard to their performances on the ME pretest. No significant between-subjects effects were discovered for the following: Grade, Group, and Sex. No significant within-subjects effects were discovered for the following: Grade x Group, Grade x Sex, Group x Sex x Grade, and Grade x Group x Sex.

An examination of the adjusted posttest means of Group 1A ($\underline{M}$ = 28.500) and Group 1B ($\underline{M}$ = 30.414) revealed that the means of the two groups were not significantly different ($\underline{p}<.05$) (see Table 13). Further examination of the adjusted means for each group revealed that students in Group 1A showed a small decrease when comparing the adjusted pretest mean and adjusted posttest mean. Group 1B showed a slight increase when the means were compared.

Table 13

Adjusted Posttest Means and ns for ME Scale by Group

Group	n	Adj. Pretest Mean	Adj. Posttest Mean
1A	42	30.048	28.500
1B	29	29.759	30.414

Research question three examined what differences in students' growth gains in self-concept might be attributed to differential levels of teacher training in gifted education. Null hypothesis number eleven that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in self-concept as measured by the ME: A Self-Concept Scale for Gifted Students when compared with fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff

development (Group 1B) was accepted. Group 1A students did not perform significantly different ($p<.05$) from Group 1B.

Research Skills

The results of the ANCOVA are presented in Appendix D. Significant effects for the research skills pretest, $F(1, 99) = 397.377$, $p < .001$, covariates were found to show that the groups differed significantly in their performance on the research skills pretest. Significant results for Group, $F(2, 99) = 4.118$, $p = .019$, and an interaction effect Grade x Group, $F(2, 99) = 3.238$, $p = .043$, were found. No significant effects for Grade or Sex, nor Grade x Sex, Group x Sex, or Grade x Group x Sex were found.

The Tukey WSD procedure was selected for the follow-up tests. Table 14 gives the adjusted posttest means for ns for group (1A and 1B) and grade (four and five). Figure 4 represents the interactions (see page 100). The significant effect for Group was included in the analysis of the interaction, Grade x Group. It is important to note that on the teacher assessment instrument, the best rating on a scale of one through five was one for a specific skill; therefore, the smaller the mean for each group, the better the achievement.

The analysis yielded significant differences between the means of the two groups of fifth grade students, Group 1A ($M = 125.850$) and Group 1B ($M = 136.662$).

Table 14

Adjusted Posttest Means * and ns for Research Skills by Group by Grade

	Group 1A		Group 1B	
	n	Mean	n	Mean
Grade 4	31	118.630	20	122.983
Grade 5	11	125.850	9	136.662

Note: * The smaller the mean, the more growth the students achieved.

Research question three examined what differences in students' growth gains in research skills might be attributed to differential levels of teacher training in gifted education. Null hypothesis number twelve that fourth and fifth grade gifted students enrolled in a combination of school-based enrichment and a pull-out program with classroom teachers having completed the staff development (Group 1A) will not show a more significant increase in research skills as measured by the GAIN Teacher Assessment of Student Research Skills, Grades

4-5 when compared with fourth and fifth grade gifted students attending a combination of school-based enrichment and a pull-out program with classroom teachers with incomplete staff development (Group 1B) was accepted. An exception is noted in Table 14 showing that Group 1A fifth graders (M = 125.850) scored significantly better than Group 1B fifth graders (M = 136.662) on the research skills teacher assessment.

Summary of Results

Research question one examined the effects of a specially developed gifted curriculum on the growth of gifted students in higher level thinking, creative thinking, self-concept, and research skills. The ANOVA yielded significant growth results ($p<.05$) for each group of students on the subscales, analysis and synthesis, of the Ross Test of Higher Cognitive Processes. Two of the three groups of students achieved significant growth results ($p<.05$) on the subscale, evaluation. The analysis of the subscale, figural fluency, of the Wallach-Kogan Creativity Instrument yielded significant growth results ($p<.05$). The remaining subscales, verbal fluency, verbal originality, and figural originality, yielded no significant results. No significant student growth in self-concept was recorded using the ME Scale. Significant student growth in research skills for all groups were recorded using the GAIN Teacher Assessment of Student Research Skills, Grades 4-5.

Repeated measures ANCOVA were conducted for research question two which addressed the comparison of administrative organizations, pull-out with a combination of school-based enrichment and pull-out. With the exception of contradictory results reported from the analysis of the research skills assessment, no significant differences were recorded for any dependent measure between the groups of students attending the gifted pull-out program and the comparison group of students who attended the gifted pull-out program combined with the school-based enrichment.

Repeated measures ANCOVA were conducted to address research question three which compared student growth resulting from differing levels of teacher training. With the exception of the analysis of the significant results ($p<.05$) of the research skills test, no significant differences were recorded for students assigned to teachers having completed the staff development compared to students assigned to teachers lacking staff development.

Chapter 5

Conclusions and Implications

In this chapter a concluding discussion that includes implications and recommendations for further research has been addressed.

Discussion

The first question in the study addressed the effects of the specially developed gifted curriculum, grades four and five, on the growth of gifted students in the skills areas: higher level thinking, creative thinking, self-concept, and research. The first area was higher level thinking skills. Follow-up tests after the repeated measures ANOVA with the dependent variables of the Ross Test, analysis, synthesis, and evaluation, yielded significant differences in the raw pretest and posttest means to record significant growth gains ($p<.05$) for each subscale for each group of students with the exception of Group 1A's performance on the subscale of evaluation.

Possibilities for student growth or lack of growth in higher level thinking skills as measured by the Ross Test of Higher Cognitive Processes have been addressed. First, evidence supported the match between the higher level thinking skills strand of the local specially developed gifted

pull-out curriculum and skills on the Ross subscales, analysis, synthesis, and evaluation. A set of higher level thinking skills was not a part of the school-based enrichment curriculum while the grade four pull-out curriculum contained a total of 14 lessons that addressed analogies, classification, inferences, syllogisms, and matrix logic and the grade five pull-out curriculum contained a total of 16 lessons that addressed analogies, temporal sequencing, inference, syllogisms, and matrix logic. In the absence of a higher level thinking skills strand in the school-based enrichment program, the argument might be made that the higher level thinking skills strand of the gifted pull-out program contributed to the significant growth, as measured by the Ross subscales, analysis, synthesis, and evaluation, that the fourth and fifth grade gifted students achieved.

No evidence was found to suggest value-added growth in higher level thinking as a result of the school-based enrichment program. The follow-up tests to the ANCOVA comparing adjusted posttest means yielded no significant differences in student growth gains for Group 1A students assigned to the combination of school-based enrichment and a pull-out compared to Group 2 students assigned to a pull-out program.

A possible explanation for the lack of growth in evaluation recorded by Group 1A students emerged from further analysis of the raw pretest and posttest means (see Table 3 in Chapter 4). Group 1A students performed significantly higher on the evaluation pretest ($\underline{M}$ = 103.810) compared to Group 1B ($\underline{M}$ = 99.810) or Group 2 ($\underline{M}$ = 98.988). Establishing a significantly higher pretest mean as the baseline from which growth was to be measured necessitated a significantly higher posttest mean compared to the other groups. The Group 1A students did not achieve significantly higher scores. The raw posttest mean revealed growth, but it was not significant growth ($\underline{p}<.05$).

Findings from previous studies (Ebmeier et al., 1985; Nielsen, 1984; VanTassel-Baska et al., 1989) along with the significant growth recorded in the present study suggested that a frequently cited goal for specially developed gifted programs, higher level thinking skills, was appropriate and that significant student growth gains could be demonstrated.

The significant growth gains in figural fluency gave some evidence that the curriculum intervention was effective. Recent studies (Fults, 1980; Kolloff, 1983; Lutfiyya, 1977) along with the evidence from the present study continued to support program goals to enhance creative thinking in

specially developed curriculum and that student growth gains could be measured.

The pull-out curriculum might not have included enough activities to practice the creative thinking skills, fluency and originality; therefore, significant student growth gains for three of the four subscales were not recorded. Rose and Lin (1984) found that growth in fluency was more likely to occur than growth in originality. Evidence from the present study suggested that the activities addressing originality of ideas should be reviewed. In addition, the evidence suggested that since no value-added growth occurred as a result of the school-based enrichment program, a strand of creative thinking skills should be added to the curriculum.

A third skills strand of the gifted curriculum was self-concept. No significant growth was recorded in this area. Possible explanations of this finding include the following key issues. First, the students maintained self-concepts that were relatively high at the start of the study. A raw score of 40 was possible for the ME Scale. The adjusted pretest means for the groups (Group 1A = 30.048, Group 1B = 29.759, Group 2 = 32.049) yielded evidence that the students had good self-concepts at the start of the study (see Tables 10 and 13 in Chapter 4). Second, a slight insignificant decrease for Group 1A and slight increase for Group 1B and Group 2 meant that the

students maintained positive self-concepts. Findings from gifted program evaluation studies (Kolloff, 1983; Nielsen, 1984) along with the results from the present study suggested that a program goal to maintain positive self-concepts of gifted students was appropriate and that program treatment did not adversely affect students in this area.

When reviewing the match of the affective skills strand of the pull-out curriculum and the ME Scale, another key issue emerged. The lack of instruments to measure gifted students' self-concepts has been noted in limitations to the study. The affective skills strand of the gifted pull-out curriculum focused on two sets of skills, self-awareness and group behavior skills, while the school-based enrichment program did not address a set of affective skills. The ME Scale measured self-concept in gifted students and addressed selected self-awareness skills from the gifted pull-out curriculum. A closer look at the strand of self-awareness skills in the gifted pull-out curriculum suggested there were a limited number of skills and activities dealing with issues found on the ME Scale. Since time was limited, the few discussions held in the pull-out program might not have changed the way students felt about themselves.

The fourth skills strand of the fourth and fifth grade gifted curriculum was research. Follow-up tests after the ANOVA yielded significant differences in the raw pretest and

posttest means to record significant growth gains ($p<.05$) for the students considered as a total group in research skills. Recently reported gifted program evaluation studies (Carter, 1986a; Tamsberg, 1987) measured student growth in research skills using locally developed criterion measures. Tamsberg (1987) recorded significant student growth while Carter (1986a) did not find significant results. These studies along with the present study which yielded significant student growth gains using a locally developed teacher assessment scale suggested that a gifted program goal, research skills, should be addressed and student growth gains should be measured.

Regarding the issue of the match between the assessment instrument and the research skills strand of the pull-out curriculum, two issues were relevant. First, all skills from the research strand of the curriculum became a part of the assessment instrument. The gifted instructional specialists developed the scope and sequence of research skills for the gifted pull-out curriculum which became the assessment instrument. Second, given that no research skills strand was included in the school-based enrichment program, the significant growth gains recorded in the study might be attributed to the pull-out curriculum. It must be noted, however, that classroom teachers might have addressed library

skills and such instruction might have contributed to the growth in research skills.

No evidence was uncovered to support value-added student growth gains in research skills for the school-based enrichment program. A further examination of the data to explain the contradictory results did not yield evidence to explain why Group 2 fifth grade students (M = 116.962) scored significantly better than Group 1A fifth grade students (M = 125.850) (see Table 11 in Chapter 4). Though the research hypothesis stated the comparison between Group 1A and Group 2 and the data analysis reported for that comparison yielded the contradictory finding, further analysis of the results among the groups should be reported.

Group 1A students were taught by teachers who had completed the staff development. Group 1B students were taught by teachers with incomplete staff development. Both groups of students attended the combination of school-based enrichment and a pull-out program; thus, both groups of students were enrolled in the same level of programming. Tables 11 and 14 in Chapter 4 show that Group 2 fifth grade students (M = 116.962) scored significantly better than Group 1B fifth grade students (M = 136.662). To address these contradictory results, the argument might be made that students in the school-based program, motivated by report

card letter grades as opposed to the center's narrative progress report, prioritized the school-based projects over the center independent study. The results could have been poorer evaluations given by the instructional specialists for the students in the combined program compared to students (Group 2) in the pull-out program only. The school-based interdisciplinary curriculum guide for grades four and five listed numerous research activities throughout the year. Evidence to document the implementation of the school-based curriculum was available as a result of (1) random classroom visitations by the program coordinator, (2) a minimum of four consultations each between the instructional specialist in the center and the classroom teacher in the school-based program, and (3) dialogue from building principals as well as school-based teachers offering successful experiences.

Overall Discussion of Student Effects

In the absence of a control group in this study, the researcher acknowledged that other experiences might have contributed to students' growth in higher level thinking skills, figural fluency, and research skills. Regular classroom experience, whether in the school-based enrichment classes or the regular classrooms, could have impacted on student growth gains. Gifted students participated in out-of-school experiences, after-school or Saturday enrichment classes, that

might have contributed to the student growth gains. For example, an out-of-school enrichment experience, Odyssey of the Mind (Micklus & Micklus, 1989), a national creative problem-solving program, was available in selected schools and six students in the study participated on creative problem-solving teams while the study was being conducted.

Factors related to conditions of testing existed that might have contributed to the lack of growth on selected dependent measures. The pre- to posttest time was short. The pull-out program one day per week began in October and closed in late May. Using testing sessions of 60 minutes per week, it took three weeks in the fall and again in the spring. The issues of test fatigue or boredom might have been factors. The state and local testing program was a lengthy spring event beginning in mid March and was comprised of the Iowa Test of Basic Skills and state criterion tests. Posttesting was completed after the state program.

Discussion of Administrative Organization

Research question two addressed the effect of the administrative organization, pull-out or a combination of school enrichment and pull-out, on gifted students' growth in higher level thinking skills, creative thinking skills, self-concept, and research skills. The follow up tests from the ANCOVA comparing the adjusted posttest means for the subscales of the

Ross Test and the Wallach-Kogan Creativity Test as well as the ME Scale and the research skills assessment between the groups did not yield any evidence that the performance of students in Group 1A was significantly better than that of students in Group 2 even though the students in Group 1A attended the pull-out and were assigned to school enrichment programs in their regular classrooms while the students in Group 2 only attended the pull-out gifted program one day each week.

McPherson (1984) did not record any significant growth gains in higher level thinking for the combined school-based enrichment and pull-out compared to the pull-out program. Evidence was not found in the present study to suggest that the school-based enrichment program yielded a value-added effect in student growth gains as measured by the Ross subscales, analysis, synthesis, and evaluation; the Wallach-Kogan subscales, fluency and originality; the ME Scale; and the research skills assessment.

The impact of pull-out programs on gifted students' self-concepts has been debated and conflicting evidence has been cited. While Rogers (1979) and Stopper (1978) offered that attendance in a pull-out gifted program contributed to a negative self-concept, other studies (Karnes & Wherry, 1981; Maddux, Scheiber, & Bass, 1982; and McCarthy, 1981) reported

no significant differences. Recent studies (Kolloff, 1983; Nielsen, 1984) along with the present study have offered evidence that a positive self-concept might be maintained with program treatment in a pull-out enrichment program.

This study has made two contributions regarding the question of administrative organization. First, gifted students achieved significant growth gains in higher level thinking skills, figural fluency, and research skills in the pull-out program treatment; but, no significant value-added student growth was recorded for those students receiving the additional program treatment of school-based enrichment. Second, gifted students in the study maintained relatively positive self-concepts while attending the pull-out program.

Discussion of Teacher Training

Research question three addressed the differential effect of the teacher training model on student growth in higher level thinking skills, creative thinking skills, self-concept and research skills. The eight teachers responsible for the school enrichment program for Group 1A had completed a minimum of six graduate credits in gifted education and attended all of the division workshops (18 inservice hours). The ten teachers responsible for the school enrichment program for Group 1B had little graduate training and scant division training. With the exception of grade five students' performance on the

research skills assessment in Group 1A, the follow-up tests from the ANCOVA comparing the adjusted posttest means for the subscale of the Ross Test, the subscale of the Wallach-Kogan Creativity Test, and the ME Scale among the groups did not yield any evidence that the performance of Group 1A was significantly better than that of students in Group 1B. Group 1B students ($\underline{M}$ = 109.816) scored significantly better on the evaluation subscale of the Ross Test compared to Group 1A students ($\underline{M}$ = 104.315).

Addressing the concern over the lack of value-added growth for the school-based enrichment program, the degree to which each school-based teacher, Group 1A or Group 1B, implemented the curriculum could not be documented. Though expected to spend 90 minutes four days each week using the interdisciplinary curriculum, time actually spent was not monitored. A second concern was the inability to document that the teachers demonstrated application of the teaching strategies presented in the course work and division training model. Course outlines as well as training session outlines were available and attendance sheets documented the teachers' participation, yet, evidence to document actual implementation was not available.

Though efforts commensurate with the allocation of staff and time resources were made to monitor classroom teachers

in the school-based enrichment program, the division training model lacked sufficient opportunities for classroom teachers to practice strategies in their classrooms and receive feedback on their performance. Showers, et al. (1987) argued for the importance of a staff development model with four components: theory, demonstration, practice, and feedback. They noted that the study of theory combined with demonstration might not contribute to a sustained classroom practice unless the teachers were given opportunities to practice in a training session and receive feedback on their performance. The only feedback opportunities for the classroom teachers were in the monthly grade level instructional meetings conducted by the instructional specialists.

Implications

The first implication of the study has been the need to add a scope and sequence of skills to the school-based enrichment curriculum for each grade level in each of the four skills areas: (1) higher level thinking, (2) creative thinking, (3) self-concept, and (4) research skills. Skills in each area were enumerated in the gifted pull-out curriculum at each grade level while the school-based enrichment curriculum lacked such skills. Instead, that curriculum focused on the integration of basic skills from the core academic areas

organized as interdisciplinary units of study. The evidence has pointed to significant growth in selected skills enumerated in the four skills areas of the gifted pull-out curriculum. No evidence was collected to suggest significant value-added growth gains as a result of school-based enrichment. It might be reasonable to further suggest that the resultant efforts should yield a scope and sequence of skills with the school-based enrichment and the pull-out continua of skills complementary to one another at each grade level in each skills area.

The second implication supported by evidence from the study has been the need to review the skills strands of the gifted pull-out program for the purpose of including additional skills and/or activities. The lack of student growth gains on the Ross subscale, evaluation, by Group 1A students has suggested the need to add specific skills as well as activities to allow gifted students more opportunities to model evaluative thinking in the gifted pull-out program. Though fluency and originality were listed in the creative thinking skills strand of the gifted pull-out curriculum and both skills were evaluated in verbal and figural constructs, the lack of student growth, excepting for figural fluency, suggested that the addition of more activities giving students more opportunities to model these skills might be appropriate.

The ME Scale pretest scores were relatively high which suggested that the gifted students began the program with good self-concepts. Though a slight insignificant decrease in the posttest mean was recorded, the evidence suggested that the students maintained their positive self-concepts. The pull-out gifted curriculum addressed self-awareness needs while the school-based enrichment curriculum did not include such a skills strand. A review of the self-awareness skills in the pull-out curriculum along with the inclusion of appropriate affective skills in the school-based curriculum might be warranted.

The evaluation of the research skills strand revealed significant growth for all students. A further examination of the set of skills in the gifted pull-out curriculum found that many of the research skills enumerated in the pull-out curriculum were basic research skills appropriate for all learners and should have been addressed by regular classroom teachers in the school-based enrichment program or the regular classroom. Given the need to develop the set of school-based enrichment research skills as discussed, the pull-out curriculum should be enhanced to reflect advanced data gathering skills as well as an emphasis on experimental research design.

Given the need for the development of a scope and sequence of skills in each area in the school-based curriculum as well as the refinement of selected skills strands suggested for the pull-out gifted curriculum, it might be reasonable to suggest that a more targeted model of collaboration between the school and the gifted centers be used. The principal, guidance counselor, and classroom teacher have addressed the cognitive as well as affective needs of gifted students four days each week and the gifted instructional specialists working with the coordinator of gifted education were responsible for meeting those needs on the fifth day of the school week. Therefore, the need for a collegial model to address more effectively all needs of gifted students has been obvious. The goals of such a collegial team might be (1) communication regarding individual students' needs, cognitive as well as affective, (2) articulation of the gifted curriculum, and (3) discussions about teaching strategies.

The advantages of such a model would be several. Evidence was cited to reflect lack of student growth in creative thinking skills as well as self-concept. All students benefit from creative thinking skills when they are taught to use such skills in problem-solving and decision making; therefore, all classroom teachers should provide activities that enhance creative thinking. When classroom teachers have provided

such a foundation, the instructional specialist should promote the application of the skills in decision making and complex problem-solving. The results from the study have suggested that the current program treatment intervention did not contribute to growth in self-concept; but, the students maintained their self-concepts. Given the critical need for nurturing as it contributes to a more positive self-concept, those responsible for the education of gifted children should be working together closely as a support team to address the affective needs of these students.

With the addition of the complementary research skills strand to the school-based enrichment program, the pull-out teachers might communicate effectively with regular classroom teachers to enable independent study to evolve out of studies the students pursue in the center or in the classroom. The teachers working together should accommodate the interests and assist the students in satisfying intellectual curiosity by enabling students (1) to focus on topics of study, (2) to assist them in using primary and secondary sources, (3) to gather data, and (4) to assist in organizing the data in a meaningful way.

The issues related to the administrative organization for the delivery of instruction have been several. The important issue might not be the arbitrary choice of one model as

compared to another. Instead, the issue might be that of what model accommodates the program best suited to the needs of the gifted students served in the district. No evidence of a significant negative impact attributed to the administrative organization was recorded. The data have suggested that those students attending the pull-out program achieved significant growth gains as previously cited while no evidence was presented to suggest that the school-based enrichment program impacted significantly on student growth gains. Consequently, another implication of the study has been the need to continue to use one or a combination of delivery systems that best accommodates the program designed to meet the needs of the gifted students served in the district. However, evidence has been presented to suggest that the school-based enrichment program might be enhanced in several ways and further evaluation of effectiveness should be completed.

Another implication of the study has been the need to continue with staff development; however, the duration of the model as well as how it addresses program needs should be reviewed. Little evidence was cited to show significant differential growth gains due to the teacher training model; however, Group 1A fifth grade students achieved significantly greater growth than Group 1B fifth grade students on research

skills. Further examination of the staff development model might be warranted to determine the appropriate issues to address in staff development. Continued inservice addressing each skills strand of the curriculum should be offered. No evidence was presented to suggest that the teachers who worked with gifted students in the regular classroom should not take the six hours of graduate credit. Such courses should give a foundation of knowledge that inservice training sessions could enhance as teachers continued to implement the school-based enrichment program in the classroom.

Recommendations for Further Research

Further research using the ME: A Self-Concept Scale for Gifted Students to evaluate the impact of program treatment on the self-concept of gifted students should be conducted. Particularly since the recommendations to develop further the affective skills strand of the pull-out program, add a school-based enrichment skills strand, and develop a collegial team of advocates in the school and the gifted center to nurture the self-concept of gifted students have been offered.

Efforts to assess student growth in research skills should continue. Since the assessment was locally developed, it should be validated by outside advocates in gifted education. When resources permit, independent raters should be used to assess growth in research skills.

Results from the present study were not definitive regarding the impact of the school-based enrichment program on student growth gains. Further evaluation of the school-based enrichment program should be conducted. Not only should gifted students be assessed but a randomly selected experimental as well as a control group of students not identified as gifted should be assessed in the study.

Further research to assess staff development using student growth gains should be conducted. In addition, attitudinal data should be gathered. Comprehensive programs complete with models of staff development in gifted education have begun to emerge. It should be natural to plan for the assessment of the staff development model in the context of the evaluation of program effectiveness.

APPENDIX A

REPEATED MEASURES ANOVA

Ross Test Dependent Variables: Analysis, Synthesis, and Evaluation

Source	df	MS	F	p
Between-Subjects Effects				
Grade	1	770.026	2.176	.143
Group	2	204.599	.578	.563
Grade x Group	2	616.444	1.742	.180
Error	106	353.903		
Within-Subjects Effects				
First Trials Factor				
Subscale	2	373.688	5.234	.006*
Subscale x Grade	2	139.883	1.959	.143
Subscale x Group	4	28.308	.397	.811
Subscale x Grade x Group	4	60.173	.843	.499
Error	212	71.393		

(Continued)

REPEATED MEASURES ANOVA (Continued)

Ross Test Dependent Variables: Analysis, Synthesis, and Evaluation

Source	df	MS	F	p
Within-Subjects Effects				
Second Trials Factor				
Time	1	7686.612	117.982	.000*
Time x Grade	1	202.276	3.105	.081
Time x Group	2	139.846	2.146	.122
Time x Grade x Group	2	2.625	.040	.961
Error	106	65.151		
Within-Subjects Effects				
Trials Interaction				
Subscale x Time	2	599.232	12.720	.000*
Subscale x Time x Grade	2	76.975	1.634	.198
Subscale x Time x Group	4	148.046	3.142	.015*
Subscale x Time x Grade x Group	4	25.644	.545	.703
Error	212	47.111		

* Significant at .05 level.

REPEATED MEASURES ANCOVA

Ross Test Dependent Variables: Analysis, Synthesis, and Evaluation

Source	df	MS	F	p
Between-Subjects Effects				
Pre Analysis	1	2560.061	25.595	.000*
Pre Synthesis	1	660.138	6.600	.012*
Pre Evaluation	1	313.119	3.131	.080
Grade	1	152.295	1.523	.220
Group	2	70.162	.701	.498
Sex	1	14.588	.146	.703
Grade x Group	2	50.764	.508	.604
Grade x Sex	1	89.607	.896	.346
Group x Sex	2	97.204	.972	.382
Grade x Group x Sex	2	59.395	.594	.554
Error	97	100.021		

(Continued)

REPEATED MEASURES ANCOVA (Continued)

Ross Test Dependent Variables: Analysis, Synthesis, and Evaluation

Source	df	MS	F	p
Within-Subjects Effects				
Subscale x Grade	2	246.101	4.574	.011*
Subscale x Group	4	165.512	3.076	.017*
Subscale x Sex	2	125.912	2.340	.099
Subscale x Grade x Group	4	72.522	1.348	.254
Subscale x Grade x Sex	2	92.946	1.727	.180
Subscale x Group x Sex	4	53.693	.998	.410
Subscale x Grade x Group x Sex	4	101.737	1.891	.114
Error	194	53.809		

* Significant at .05 level.

APPENDIX B

REPEATED MEASURES ANOVA

Wallach-Kogan Originality Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Between-Subjects Effects				
Grade	1	178.325	3.732	.056
Group	2	38.089	.797	.453
Grade x Group	2	104.060	2.178	.118
Error	106	47.781		
Within-Subjects Effects				
First Trials Factor				
Subscale	1	9.488	.538	.465
Subscale x Grade	1	3.586	.203	.653
Subscale x Group	2	8.489	.481	.619
Subscale x Grade x Group	2	9.475	.537	.586
Error	106	17.632		

(Continued)

REPEATED MEASURES ANOVA (Continued)

Wallach-Kogan Originality Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Within-Subjects Effects				
Second Trials Factor				
Time	1	11.217	.812	.370
Time x Grade	1	3.201	.232	.631
Time x Group	2	.078	.006	.994
Time x Grade x Group	2	4.049	.293	.747
Error	106	13.816		
Within-Subjects Effects				
Trials Interaction				
Subscale x Time	1	1.691	.137	.712
Subscale x Time x Grade	1	10.769	.875	.352
Subscale x Time x Group	2	12.452	1.012	.367
Subscale x Time x Grade x Group	2	1.877	.153	.859
Error	106	12.306		

* Significant at .05 level.

REPEATED MEASURES ANOVA

Wallach-Kogan Fluency Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Between-Subjects Effects				
Grade	1	17090.882	2.264	.135
Group	2	18650.723	2.471	.089
Group x Grade	2	9210.866	1.220	.299
Error	106	7547.530		
Within-Subjects Effects				
First Trials Factor				
Subscale	1	243498.837	167.722	.000*
Subscale x Grade	1	21995.084	15.150	.000*
Subscale x Group	2	1212.135	.835	.437
Subscale x Group x Grade	2	1632.327	1.124	.329
Error	106	1451.797		

(Continued)

REPEATED MEASURES ANOVA (Continued)

Wallach-Kogan Fluency Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Within-Subjects Effects				
Second Trials Factor				
Time	1	1231.539	.666	.416
Time x Grade	1	5380.292	2.909	.091
Time x Group	2	2303.479	1.246	.292
Time x Group x Grade	2	739.709	.400	.671
Error	106	1849.403		
Within-Subjects Effects				
Trials Interaction				
Subscale x Time	1	8275.986	12.452	.001*
Subscale x Time x Grade	1	250.597	.377	.541
Subscale x Time x Group	2	1481.365	2.229	.113
Subscale x Time x Group x Grade	2	1915.771	2.883	.060
Error	106	664.618		

* Significant at .05 level.

REPEATED MEASURES ANCOVA

Wallach-Kogan Fluency Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Between-Subjects Effects				
Pre Verbal Fluency	1	24584.736	7.372	.008*
Pre Figural Fluency	1	36608.417	10.977	.001*
Grade	1	2259.533	.678	.412
Group	2	2535.201	.760	.470
Sex	1	3519.856	1.055	.307
Grade x Group	2	323.040	.097	.908
Grade x Sex	1	1.478	.000	.983
Group x Sex	2	4582.478	1.374	.258
Grade x Group x Sex	2	824.316	.247	.781
Error	98	3335.053		

(Continued)

REPEATED MEASURES ANCOVA (Continued)

Wallach-Kogan Fluency Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Within-Subjects Effects				
Subscale	1	223.080	.197	.658
Subscale x Grade	1	3676.416	3.252	.074
Subscale x Group	2	2084.979	1.845	.164
Subscale x Sex	1	2271.851	2.010	.159
Subscale x Grade x Group	2	2358.441	2.086	.130
Subscale x Grade x Sex	1	2.735	.002	.961
Subscale x Group x Sex	2	1117.206	.988	.376
Subscale x Grade x Group x Sex	2	1051.201	.930	.398
Error	98	1130.355		

* Significant at .05 level.

REPEATED MEASURES ANCOVA

Wallach-Kogan Originality Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Between-Subjects Effects				
Pre Verbal Originality	1	395.564	19.426	.000*
Pre Figural Originality	1	222.645	10.934	.001*
Grade	1	3.051	.150	.700
Group	2	2.558	.126	.882
Sex	1	80.641	3.960	.049*
Grade x Group	2	7.898	.388	.680
Grade x Sex	1	36.543	1.795	.183
Group x Sex	2	14.753	.725	.487
Grade x Group x Sex	2	7.811	.384	.682
Error	98	20.362		

(Continued)

REPEATED MEASURES ANCOVA (Continued)

Wallach-Kogan Originality Dependent Variables: Verbal and Figural

Source	df	MS	F	p
Within-Subjects Effects				
Subscale	1	52.174	3.857	.052
Subscale x Grade	1	2.750	.203	.653
Subscale x Group	2	19.196	1.419	.247
Subscale x Sex	1	11.966	.885	.349
Subscale x Grade x Group	2	9.936	.735	.482
Subscale x Grade x Sex	1	54.814	4.052	.047*
Subscale x Group x Sex	2	6.977	.516	.599
Subscale x Grade x Group x Sex	2	10.439	.772	.465
Error	98	13.527		

* Significant at .05 level.

APPENDIX C

REPEATED MEASURES ANOVA

Dependent Variable: ME Scale

Source	df	MS	F	p
Grade	1	26.809	.669	.415
Group	2	197.581	4.927	.009*
Group x Grade	2	31.940	.797	.454
Error	106	40.099		
Time	1	.342	.031	.861
Time x Grade	1	2.752	.249	.619
Time x Group	2	11.143	1.007	.369
Time x Group x Grade	2	7,802	.705	.496
Error	106	11.069		

* Significant at .05 level.

REPEATED MEASURES ANCOVA

Dependent Variable: ME Scale

Source	df	MS	F	p
Pre Me	1	1033.438	50.505	0.000*
Grade	1	1.326	0.065	0.800
Group	2	30.869	1.509	0.226
Sex	1	0.825	0.040	0.841
Grade x Group	2	6.258	0.306	0.737
Grade x Sex	1	51.082	2.496	0.117
Group x Sex x Grade	2	14.408	0.704	0.497
Grade x Group x Sex	2	34.608	1.691	0.190
Error	99	20.462		

* Significant at .05 level.

APPENDIX D

REPEATED MEASURES ANOVA

Dependent Variable: Research Skills

Source	df	MS	F	p
Grade	1	48020.551	23.107	.000*
Group	2	3750.568	1.805	.170
Group x Grade	2	7339.774	3.532	.033*
Error	106	2078.221		
Time	1	146889.285	1143.265	.000*
Time x Grade	1	3870.729	22.343	.000*
Time x Group	2	1109.184	8.633	.000*
Time x Group x Grade	2	1078.234	8.392	.000*
Error	106	128.482		

* Significant at .05 level.

REPEATED MEASURES ANCOVA

Dependent Variable: Research Skills

Source	df	MS	F	p
Pre Research Skills	1	73076.826	397.377	0.000*
Grade	1	540.879	2.941	0.089
Group	2	757.337	4.118	0.019*
Sex	1	189.368	1.030	0.313
Grade x Group	2	595.521	3.238	0.043*
Grade x Sex	1	7.080	0.039	0.845
Group x Sex	2	115.512	0.628	0.536
Grade x Group x Sex	2	55.135	0.300	0.742
Error	99	183.898		

*Significant at .05 level.

References

Adkins, D., & Harty, H. (1984). Longitudinal view of teacher-leaders' reaction toward gifted education. Roeper Review, 6 (1), 111-115.

Anthony, M., Iwanicki, C., & Spears, J. (1977). Shared approach to gifted education: A defensible program. Unpublished manuscript. (Available from Mansfield Public Schools, Mansfield, CT.)

Bigelow, C. J. (1983). A study of the comparative achievement of academically gifted, intermediate grade students in a five-day per week and a one-day per week program. Newark, DE: University of Delaware. (ERIC Document Reproduction Service No. ED 250 851)

Bruner, J. S. (1960). The process of education. Cambridge, MA: Harvard University Press.

Carter, K. R. (1986a). A cognitive outcome study to evaluate curriculum for the gifted. Journal for the Education of the Gifted, 10 (1), 41-55.

Carter, K. R. (1986b). Evaluating the consequences of participating in a gifted pullout program. Journal for the Education of the Gifted, 9 (4), 265-275.

Chan, L. K. S. (1988). The perceived competence of intellectually talented students. Gifted Child Quarterly, 32 (3), 310-314.

Clark, B. (1979). Growing up gifted. Columbus, OH: Charles E. Merrill.

Clasen, D. R., & Subkoviak, M. J. (1982, March). College for kids. An innovative enrichment program for gifted elementary children. Paper presented at the annual meeting of the American Educational Research Association, New York, NY.

Coleman, J. M., & Fults, B. A. (1982). Self-concept and the gifted classroom: The role of social comparisons. Gifted Child Quarterly, 36 (3), 116-119.

Coleman, J. M., & Fults, B. A. (1983). Self-concept and the gifted child. Roeper Review, 5 (4), 44-47.

Covington, M. V., Crutchfield, R. S., Davies, L., & Olton, P. M. (1974). The productive thinking program: A course in learning to think. Columbus, OH: Charles E. Merrill.

Cox, J., Daniel, N., & Boston, B. (1987). Educating able learners: Programs and promising practices. Austin, TX: University of Texas Press.

Davison, D. (1985). The Downington educational enrichment program: An evaluation (Pennsylvania). Dissertation Abstracts International, 47, 859.

Dettmer, P. (1986). Gifted program inservice and staff development: Pramatics and possibilities. Gifted Child Quarterly, 30 (3), 99-102.

Dunn, L. L., & Markwardt, F. C., Jr. (1970). PIAT Peabody individual achievement test manual. Circle Pines, MN: American Guidance Service.

Ebmeier, H., Dyche, B., Taylor, P., & Hall, M. (1985). An empirical comparison of two program models for elementary gifted education. Gifted Child Quarterly, 29 (1), 15-19.

Feldhusen, J. F. (1986a). A Conception of giftedness. In R. Sternberg & J. Davidson (Eds.) Conceptions of giftedness. New York, NY: Cambridge University Press.

Feldhusen, J. F. (1986b). Policies and Procedures for the Development of Defensible Programs for the Gifted. In J. Maker (Ed.), Critical Issues in Gifted Education. Rockville, MD: Aspen.

Feldhusen, J. F., & Hoover, S. M. (1986). A conception of giftedness: Intelligence, self-concept and motivation. Roeper Review, 8 (3),140-143.

Feldhusen, J. F., & Kolloff, M. B. (1978). A three-stage model for gifted education. G/C/T, 1 (4), 3-50, 53-58.

Feldhusen, J. F., & Kolloff, M. B. (1981). ME: A self-concept scale for gifted students. Perceptual and Motor Skills, 53, 319-323.

Feldhusen, J. F., & Kolloff, M. B. (1983). The effects of enrichment on self-concept and creative thinking. Gifted Child Quarterly, 28 (2), 53-57.

Fenuele, J. (1985). The use of a linear model in identifying gifted elementary school children and in predicting those who will succeed in special programs. Dissertation Abstracts International, 47, 772.

Feuerstein, R. (1980). Instrumental enrichment: An intervention program for cognitive modifiability. Baltimore, MD: University Park Press.

Fults, E. A. (1980). The effects of an instructional program on the creative thinking skills, self-concept, and leadership of intellectually and academically gifted elementary students. Dissertation Abstracts International, 41, 2931. (University Microfilms No. AAD80-29001).

Gallagher, J. J. (1966). Research summary on gifted child education. Springfield, IL: Office of the Superintendent of Public Information, 1966.

Gallagher, J. (1985). Teaching the gifted child. (3rd. ed.). Boston, MA: Allyn and Bacon.

Gallagher, J. J., & Weiss, P. (1982). Report on the education of the gifted Volume 2: Program effectiveness education of gifted and talented students: A review. Chapel Hill, NC: Frank Porter Graham Child Development Center, University of North Carolina at Chapel Hill.

Gallagher, J., Weiss, P., Oglesby, K., & Thomas, T. (1983). The status of gifted/talented education: United States surveys of needs, practices and policies. Los Angeles, CA: The National/State Leadership Training Institute on the Gifted and Talented.

Glass, G. V., McGaw, B., & Smith, M. L. (1981). Meta-analysis in social research. Beverly Hills, CA: Sage Publications.

Gowan, J. C. (1981). Guiding the creative development of the gifted and talented. In J. C. Gowan, J. Khatena, & E. P. Torrance (Eds.), Creativity: Its educational implications. Dubuque, IA: Kendall/Hunt Publishing Co.

Guilford, J. P. (1967). The nature of human intelligence. New York: McGraw-Hill.

Hanninen, G. (1981). Gifted/talented program description. Unpublished manuscript. (Available from Kalispell School District #5, 233 First Avenue, E., Kalispell, MT, 59901).

Hanninen, G. E. (1988). A study of teacher training in gifted education. Roeper Review, 10 (3), 139-144.

Harter, S. (1982). The perceived competence scale for children. Child Development, 53, 82-97.

Harty, H., Adkins, D. M., & Hungate, E. W. (1984). Exploring self-concept and locus of control of students in two recognized approaches to elementary school gifted education. Roeper Review, 7 (2), 88-91.

Herrnstein, P. J., Nickerson, R. S., Sanchez, M., & Swets, J. A. (1986). Teaching thinking skills. Unpublished manuscript.

Janos, P. M., Fung, H. C., & Robinson, N. M. (1985). Self-concept, self-esteem, and peer relations among gifted children who feel "different." Gifted Child Quarterly, 29 (2), 78-81.

Joyce, B., Showers, B., & Rolheiser-Bennett, C. (1987). Staff development and student learning: A synthesis of research on models of teaching. Educational Leadership, 45 (2), 11-23.

Kaplan, S. N. (1974). Providing programs for the gifted and the talented: A handbook. Ventura, CA: Office of the Ventura County Superintendent of Schools.

Kaplan, S. N. (1979). Inservice training manual: Activities for developing curriculum for the gifted/talented. Los Angeles, CA: Leadership Training Institute on the Gifted and Talented.

Karnes, F. A., & Wherry, J. N. (1981). Self-concepts of gifted students as measured by the Piers-Harris children's self-concept scale. Psychological Reports, 49, 903-906.

Keating, D. (1976). Intellectual talent: Research and development. Baltimore, MD: The Johns Hopkins University Press.

Ketcham, B., & Snyder, R. T. (1977). Self-attitudes of the intellectually and socially advantaged student: Normative study of the Piers-Harris children's self-concept scale. Psychological Reports, 40, 111-116.

Khatena, J. (1976). Major Directions in creativity research. Gifted Child Quarterly, 20, 336-349.

Khatena, J., & Dickerson, E. C. (1973). Training sixth grade children to think creatively with words. Psychological Reports, 32, 841-842.

Kolloff, M. B. (1983). The effects of an enrichment program on the self-concepts and creative thinking abilities of gifted and creative elementary students. Dissertation Abstracts International, 44, 2676. (University Microfilms No. 84-000376)

Kolloff, M. B., & Feldhusen, J. F. (1981). PACE: An application of the Purdue three-stage model. G/C/T, 18, 47-50.

Kramer, L. R. (1987). Differences in learning and achieving in self-contained and resource room programs for the gifted. Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.

Lipman, M. (1985). Thinking skills fostered by philosophy for children. In J. W. Segal & S. F. Chipman (Eds.), Thinking and learning skills. Hillsdale, NJ: Eribaum.

Lutfiyya, L. A. (1977). A comparison of the achievement, self-concept, creative thinking, and realistic self-evaluation of gifted and talented students within and without special programs for gifted and talented students in grades 4-12. Dissertation Abstracts International, 38, 5382A. (University Microfilms No. 78-1162).

Lym, C. L., & Rick, P. J. (1980, April). The effect of participation in a resource room enrichment program on the cognitive skills of fourth through sixth graders of high academic standing or potential. Paper presented at the annual meeting of the American Educational Research Association, Boston, MA.

Maddux, C. D., Scheiber, L. M., & Bass, J. E. (1982). Self-concept and social distance in gifted children. Gifted Child Quarterly, 26 (2), 77-81.

Maker, J. (1982). Curriculum development for the gifted. Rockville, MD: Aspen.

Maker, J. (1986). Qualitatively different: Is it a key concept in defining giftedness? In N. J. Maker (Ed.), Critical issues in gifted education. Rockville, MD: Aspen.

Mansfield, R., Busse, T., & Krepelka, E. (1978). The effectiveness of creativity training. Review of Educational Research, 48 (4), 517-536.

Marland, S. (1972). Education of the gifted and talented: Report to the Congress of the United States. Washington, D.C.: U. S. Government Printing Office.

McCarthy, B. B. (1981). Effects of a special educational program upon gifted and talented elementary school children, their teachers, parents and peers. Dissertation Abstracts International, 42, 2576. (University Microfilm No. AAD81-18818).

McPherson, C. R. (1984). A study of curriculum differentiation and its relationship to the development of higher cognitive processes of gifted. Dissertation Abstracts International, 45, 3113. (University Microfilms No. DA84-27968).

Meeker, M. (1969). The structure of intellect: Its interpretation and uses. Columbus, OH: Merrill.

Micklus, S. M., & Micklus, C. S. (1989). Odyssey of the Mind Program handbook. Glassboro, NJ: Glassboro State University.

Nickerson, Raymond (1984). Kinds of thinking taught in current programs. Educational Leadership, 42, 26-36.

Nielsen, M. E. (1984). Evaluation of a rural gifted program: Assessment of attitudes, self-concepts, and critical thinking skills of high-ability students in grades 3 through 12. Dissertation Abstracts International, 45, 3114. (University Microfilms No. AAD85-00417).

Norris, S. P. (1985). Synthesis of research on critical thinking. Educational Leadership, 42, 40-45.

Parnes, S. J., & Treffinger, D. J. (1973). Development of new criteria for the evaluation of creative studies programs (Project No. 2B019). Buffalo, NY: State University College at Buffalo.

Passow, A. H. (1979). The gifted and talented: Their education and development. In The seventy-eighth yearbook of the national society for the study of education, Part I. Chicago, IL: University of Chicago Press.

Piers, E. V. (1969). Manual for the Piers-Harris children's self-concept scale. Nashville, TN: Counselor Recordings & Tests.

Renzulli, J. (1977). The enrichment triad model. Mansfield Center, CT: Creative Learning Press.

Renzulli, J. (1987). The positive side of pull-out programs. Journal for the education of the gifted, X (4), 245-254.

Robinson, M. (1980). SEAGULL: A project for releasing potential of the gifted. Childhood Education, 269-273.

Rogers, B. S. (1979). Effects of an enrichment program screening process on the self-concept and others' concept of gifted elementary children. Dissertation Abstracts International, 40, 4006.

Rolheiser-Bennett, N. C. (1986). Four models of teaching: A meta-analysis of student outcomes (strategies, memory, cooperative learning, synectics). Dissertation Abstracts International, 47 (11-A), 3966. (University Microfilms No. AAD87-05887).

Rose, L. H., & Lin, H. (1984). A meta-analysis of creative behavior. Journal of Creative Behavior, 18 (1), 11-22.

Ross, J. D., & Ross, C. M. (1976). Ross test of higher cognitive processes. Novalto, CA: Academic Therapy Publications.

Schlichter, C. (1981). The multiple talent approach in mainstream and gifted programs. Exceptional Children, 48 (3), 144-150.

Showers, B., Joyce, B., & Bennett, B. (1987). Synthesis of research on staff development: A framework for future study and a state-of-the-art analysis. Educational Leadership, 45 (3), 77-87.

Silverman, L. K. (1988). Affective curriculum for the gifted. In J. VanTassel-Baska (Ed.), Comprehensive curriculum for gifted learners (pp. 335-355). Boston, MA: Allyn and Bacon.

Slosson, R. L. (1985). Slosson intelligence test (SIT) for children and adults. East Aurora, NY: Slosson Educational Publications.

Spangler, L. J. (1985). The development of a scheme for staff development in gifted education. Dissertation Abstracts International, 47 (2), 380-A. (University Microfilms No. 86-08518).

Sternberg, R. (1985). Beyond I.Q.: A triarchic theory of intelligence. New York, NY: Cambridge University Press.

Sternberg, R., & Bhana, K. (1986). Synthesis of research on the effectiveness of intellectual skills programs: Snake-oil remedies or miracle cures? Educational Leadership, 44 (2), 60-67.

Stopper, C. J. (1978). The relationships of the self-concept of gifted and non-gifted elementary school students to achievement, sex, grade level, and membership in a self-contained academic program for the gifted. Dissertation Abstracts International, 40, 90A.

Tamsberg, M. S. (1987). Gifted and talented program evaluation: The acquisition of research skills in grades 3-8. Dissertation Abstracts International, 48, 2314. (University Microfilms No. 78-1162).

Torrance, E. P. (1962). Guiding creative talent. Englewood Cliffs, NY: Prentice-Hall.

Torrance, E. P. (1974). Torrance tests of creative thinking: Norms-technical manual. Lexington, MA: Personnel Press.

Torrance, E. P. (1977). Discovery and nurturance of giftedness in the culturally different. Reston, VA: Council for Exceptional Children.

Traxler, M. (1987). Gifted education program evaluation: A national review. Journal for the Education of the Gifted, X (2), 107-113.

Treffinger, D. J., & Poggio, J. (1972). Needed research on the measurement of creativity. Journal of Creative Behavior, 6(4), 253-267.

U. S. Office of Education (1976). Programs for the gifted and talented. The Federal Register, 41, 18665-18666.

VanTassel-Baska, J. (1988a). Curriculum for the gifted: Theory, research, and practice. In J. VanTassel-Baska (Ed.), Comprehensive curriculum for gifted learners (pp. 1-19). Boston, MA: Allyn and Bacon.

VanTassel-Baska, J. (1988b). Curriculum planning and development. In J. VanTassel-Baska (Ed.), Comprehensive curriculum for gifted learners (pp. 23-52). Boston, MA: Allyn and Bacon.

VanTassel-Baska, J. (1988c). Curriculum design issues in developing a curriculum for the gifted. In J. VanTassel-Baska (Ed.), Comprehensive curriculum for gifted learners (pp. 53-76). Boston, MA: Allyn and Bacon.

VanTassel-Baska, J., Meyer, E., & Willis, G. B. (1989). Evaluation of a full-time self contained class for gifted students. Gifted Child Quarterly, 33 (1), 7-11.

Wallach, M. A., & Kogan, N. (1965). Modes of thinking in young children. NY: Holt, Rinehart and Winston, 1965.

Ward, V. (1961). Educating the gifted: An axiomatic approach. Columbus, OH: Charles E. Merrill.

Wood, Sue, & Leadbeater, Patricia (1986). Stages of entry for target groups participating in gifted programs inservice and staff development. Gifted Child Quarterly, 30 (3), 127-130.

VITA

Mary Frances Briley

Birthdate: May 2, 1944

Birthplace: Williamston, North Carolina

Education:

1972-1975 The College of William and Mary
Williamsburg, Virginia
Master of Education

1963-1966 The College of William and Mary
Williamsburg, Virginia
Bachelor of Arts